U.S. Department
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Administration

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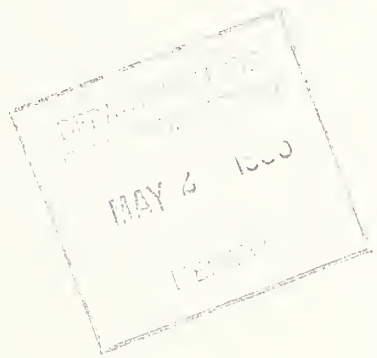
September 1984

Final Report

Side-Impact Aggressiveness Attributes
Car-To-Pole Side Impact Test of a 45° Crabbed Moving 1977 Volkswagen Rabbit Into a Fixed Rigid Pole at 25.0 Mph



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SIDE IMPACT AGGRESSIVENESS ATTRIBUTES CAR-TO-POLE SIDE IMPACT TEST OF A 45° CRABBED MOVING 1977 VOLKSWAGEN RABBIT INTO A FIXED RIGID POLE AT 25.0 MPH	SEPTEMBER 1984
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16. Abstract

This test report documents a pole crash test conducted under NHTSA Contract DTNH22-82-A-08401, Task Order SRL 92 entitled, "Side Impact Aggressiveness Attributes". Testing was conducted on a 1977 Volkswagen Rabbit 2-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was structurally modified to the level designated "Optimized" and also contained additional padding on the driver door and the left rear occupant wall. The test vehicle was towed into a fixed, rigid pole, crabbed at a 45 degree angle with a velocity of 25.0 mph. The impact point was 9.0 inches forward of the vehicle wheelbase centerline. Vehicle accelerations were measured, along with occupant responses of two side impact dummies. One dummy was located in the driver's designated seating position and one was located in the left rear passenger position. The test date was August 16, 1984 and the ambient temperature was 82° F.

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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The purpose of this crash test was to assess occupant safety when a vehicle impacts a pole at a 45^{o} angle, 9 inches forward of the vehicle wheelbase centerline. The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A modified 1977 Volkswagen Rabbit 2-door hatchback was towed into a fixed, rigid pole on August 16, 1984, with the driver's side of the car leading at a 45^{o} angle. The intended test speed and impact point were 25 mph and 9 inches forward of the wheelbase centerline respectively. Actual impact velocity was 25.0 mph and the actual impact point was 9.0 inches forward of the wheelbase centerline. This test was conducted to assess occupant safety under the previous stated impact conditions.

The vehicle was structurally modified to the level designated "Optimized". The driver door and left rear occupant wall contained additional padding.

The General Test and Vehicle Parameter Data are contained in Section 2. Section 3 contains all data required by R & D. Pre-test and post-test vehicle and dummy photographs are found in Appendix A. Appendix B contains all Data Plots.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Volkswagenwerk AG

MAKE/MODEL: Volkswagen Rabbit VIN: 1773372227

BODY STYLE: 2-Door Hatchback MODEL YEAR: 1977

NHTSA NO.: R & D COLOR: Silver Green

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 97 CID

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 7/9/84 ODOMETER READING: 14800

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? No, structurally optimized modification.
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Fair

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST: NA

VEHICLE MANUFACTURED BY:

DATE OF MANUFACTURE:

GVWR: LBS.,

GAWR: FRONT LBS., REAR LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 35 psi; REAR 35 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Michelin XZX 155 SR 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? No

IS SPARE TIRE STANDARD EQUIPMENT? Yes

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS):

RIGHT FRONT	600 LBS.	RIGHT REAR	370	LBS.
LEFT FRONT	660 LBS.	LEFT REAR	360	LBS.
TOTAL FRONT WEIGHT	1260	LBS. (63.3 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	730	LBS. (36.7 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	1990	LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 25 1/4	;LF 24 7/8	;RR 24 1/2	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 24 3/4	;LF 23 9/16	;RR 21 1/2	;LR 20 3/4
POST-TEST ATTITUDE:	RF 25 5/8	;LF 23	;RR 20 11/16	;LR 20 15/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 262 LBS. CARGO:

RIGHT FRONT	610 LBS.	RIGHT REAR	625	LBS.
LEFT FRONT	770 LBS.	LEFT REAR	610	LBS.
TOTAL FRONT WEIGHT	1380	LBS. (52.8 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1235	LBS. (47.2 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2615	LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 LBS.

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 3.0 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 10.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 27 psi; REAR 27 psi

RECOMMENDED TIRE SIZE: 155 SR 13 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Front - Bucket
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
2 REAR
4 TOTAL

CARGO LOAD 262 LBS.

TOTAL 862 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

TEST CONDITIONS

TEST NUMBER: 840816

DATE OF TEST: August 16, 1984 TIME OF TEST: 12:30

WIND VELOCITY: 4-8 mph 333° NW HUMIDITY: 35 %

AMBIENT TEMPERATURE AT IMPACT AREA: 82° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 80° F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.)	2615	2600
VEHICLE VELOCITY (MPH)*	25.0	25.0
IMPACT POINT (INCHES)**	9.0	9.0

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:	SID			SID	
SERIAL NO.:	06			U02	
INSTRUMENTATION:					
HEAD ACCEL.:	Yes			Yes	
CHEST ACCEL.:	Yes (Upper/Lower)			Yes (Upper/Lower)	
FEMUR L.C.'S:	No			No	
OTHER:	Pelvis/Ribs			Pelvis/Ribs	

RESTRAINT SYSTEM: Both dummies were unrestrained

* As measured over final one foot of travel.

** As measured forward of the midpoint of the vehicle's wheelbase.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	Side Window, Windshield, Pole	Side Header, Side Window
Chest	Driver's Inner Door Panel	Inner Quarter Panel, B-Pillar
Abdomen	Driver's Inner Door Panel	Inner Quarter Panel
Left Knee	Driver's Inner Door Panel	Inner Quarter Panel
Right Knee	Left Knee	Left Knee

DOOR OPENING:

	LEFT	RIGHT
Front	DNA*	Tools Required
Rear	DNA	DNA

SEAT MOVEMENT:

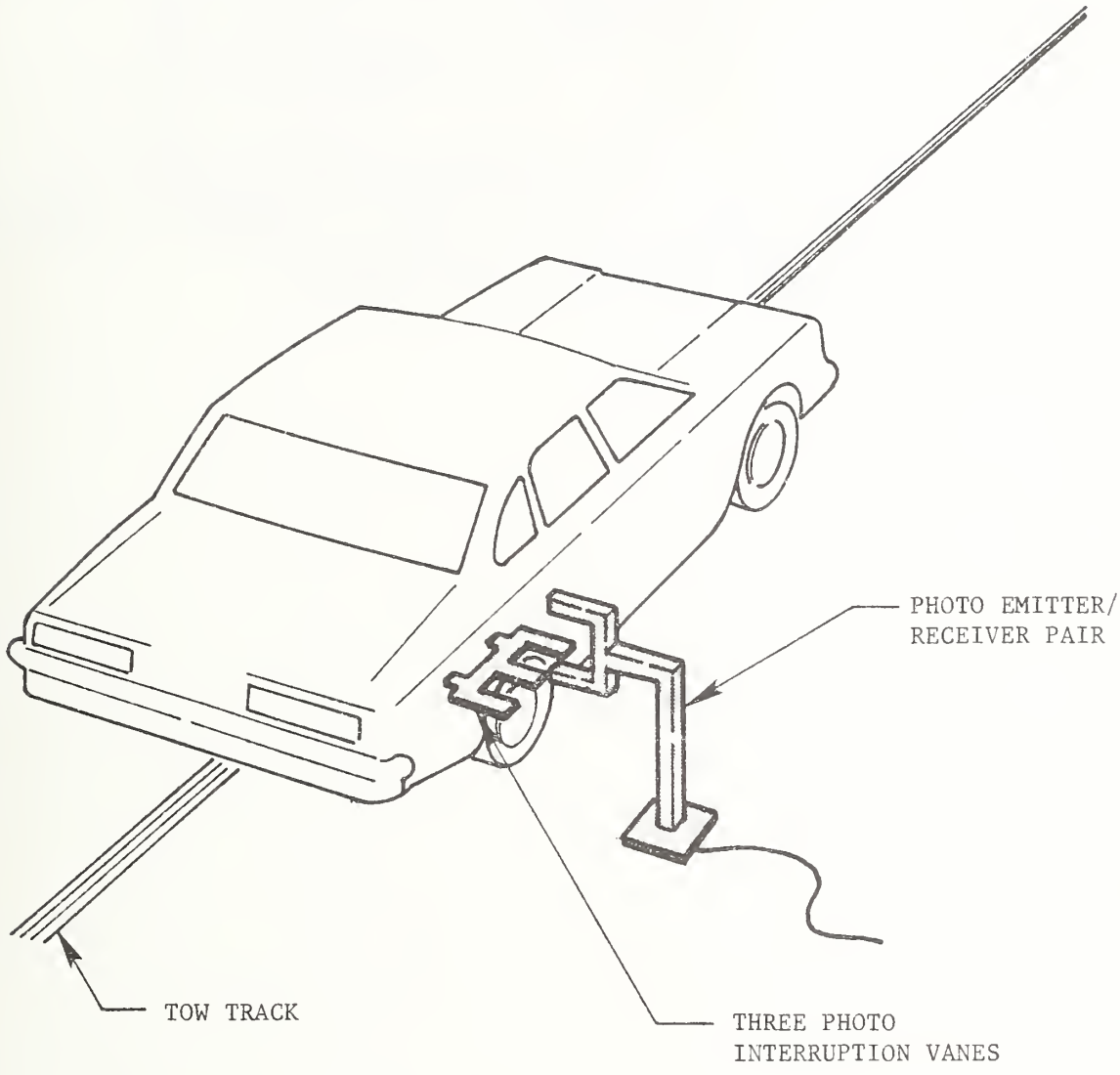
	SEAT BACK FAILURE	SEAT SHIFT
Front	Yes	Yes
Rear	No	No

GLAZING DAMAGE: Left rear window fell out, left front window shattered. Windshield cracked, possibly from impact of dummy's head.

OTHER NOTABLE IMPACT EFFECTS: Driver's seat rotated approximately 45° counter-clockwise.

*The driver's door was to remain closed for subsequent door opening effort studies.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
Number of Dummies X 174 lbs. +
Cargo Weight
= 1990 + 2 X 174 + 262 lbs.
= 2600 lbs.

To achieve test weight, 3.0 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

SECTION 3.0

DATA REQUIRED BY R & D

The following pages are included in this section:

1. Dummy temperature control and position data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

SIDE IMPACT DUMMY	DRIVER DSP	REAR PASSENGER DSP
HEAD	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.
UPPER TORSO	Placed against seat back. Midsagittal plane is vertical and centered on bucket seat.	Placed against seat back. Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
LOWER TORSO	Midsagittal plane is vertical and centered on bucket seat.	Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
UPPER LEGS (thighs or femurs)	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.
KNEES	Knees set 14.5" apart between pivot bolt head outer surfaces. Outer surface of right knee pivot bolt is 8.6" from midsagittal plane of dummy. Outer surface of left knee pivot bolt is 5.9" from midsagittal plane of dummy.	Located so that planes defined by femur and tibia centerlines are as close as possible to vertical.
LOWER LEGS	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.
RIGHT FOOT	Placed on undepressed accelerator pedal -- rearmost point of heel on floorplan in plane of pedal.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.
LEFT FOOT	Placed on toeboard -- rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

*NOTE: THE SIDE IMPACT DUMMY DOES NOT INCLUDE ARMS.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R & D

MFR./MAKE/MODEL: Volkswagen Rabbit

FRONT SEAT TYPE: ____ BENCH
X BUCKET
____ SPLIT BENCH

ADJUSTER TYPE: X MANUAL
____ POWER

BUCKET SEAT BACK TYPE: ____ FIXED
X ADJUSTABLE

TECHNICIANS:
1. N. Echeverria
2. D. LeVally
3. B. Miller

POSITIONING DATE: 8/16/84

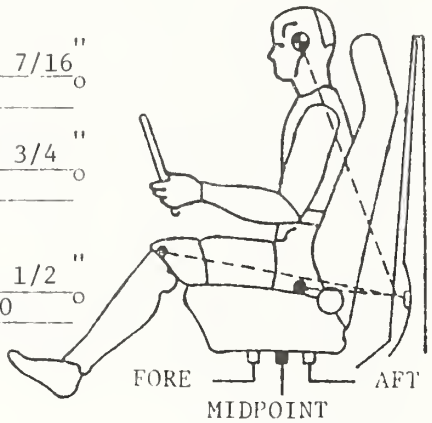
AMBIENT TEMP.: 70° F. TIME: 7:20

DRIVER DUMMY # 06

HEAD 21 7/16 "
TARGET* 41 °

KNEE 32 3/4 "
JOINT 96 °

APPROX.
"H" 19 1/2 "
POINT 120 °

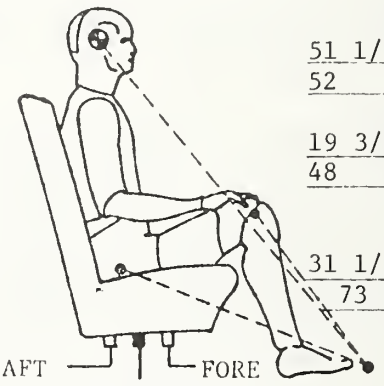


REAR PASSENGER DUMMY # U02

51 1/8 "HEAD
52 °TARGET**

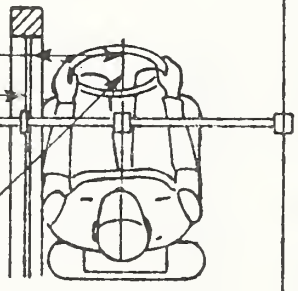
19 3/4 "KNEE
48 °JOINT

APPROX.
31 1/4 " "H"
73 °POINT



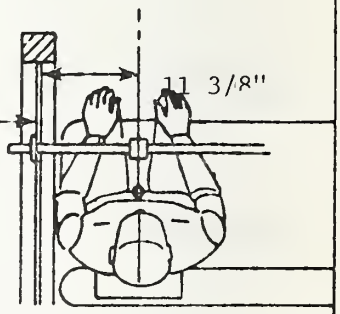
DOOR GLASS HEIGHT*** 11 5/16"
9 3/4"

LATERAL BAR ADJUSTABLE POINTER



DRIVER DUMMY # 06

DOOR GLASS HEIGHT DNA 11 3/8"

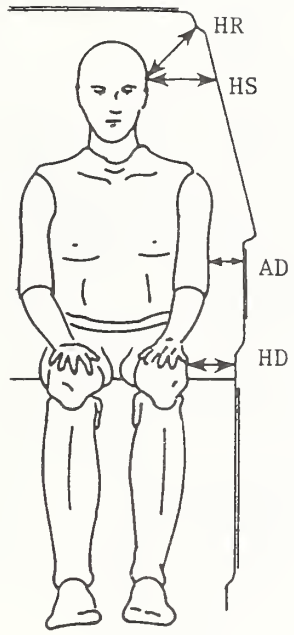


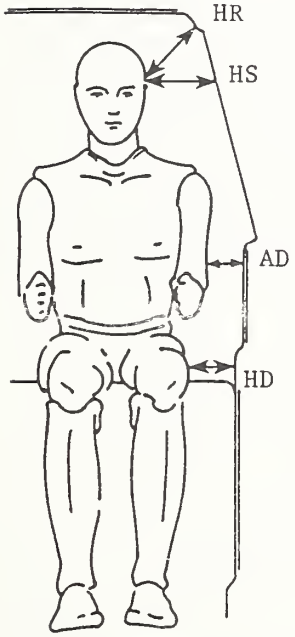
PASSENGER DUMMY # U02

*All driver dummy dimensions referenced to top of striker bolt and all angles referenced to vertical.

**All passenger dummy dimensions referenced to front seat back latch bolt with front seat in mid-position and all angles referenced to vertical.

***Door glass height is equal on the right and left side of vehicle at dummy nose level.

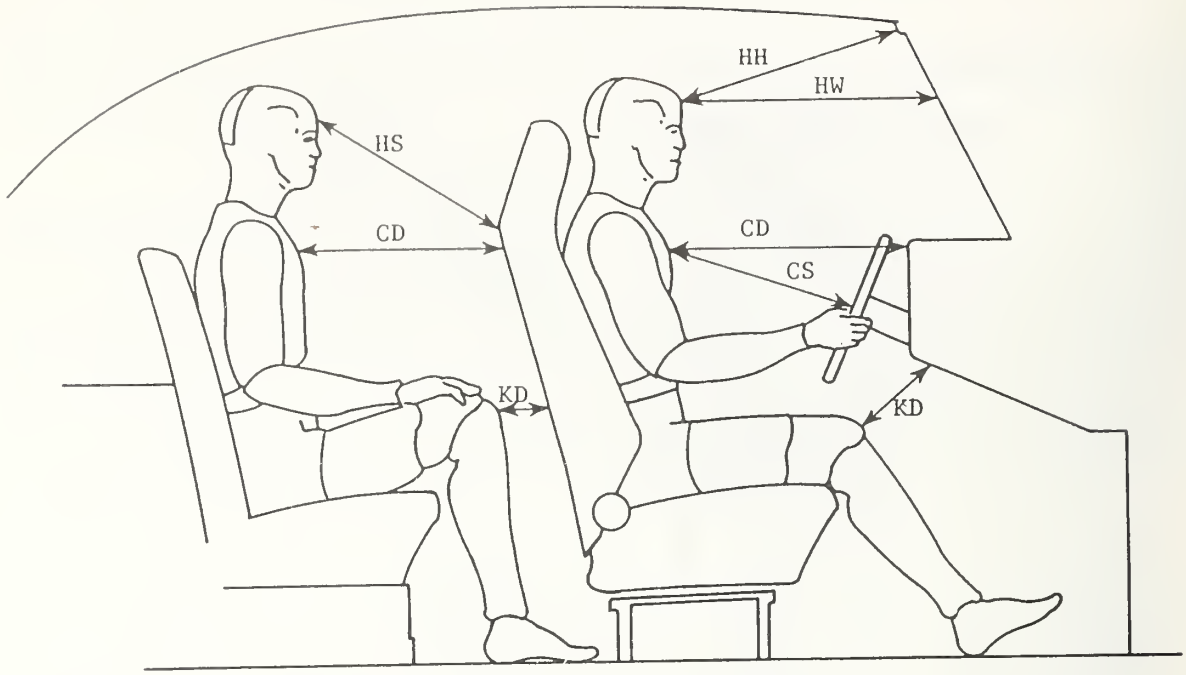




	DRIVER 06	PASSENGER U02
HR	6 5/8	7 3/8
HS	8 5/16	8 1/8
AD	3 1/2	2 1/4
HD	5 3/4	5 7/8

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



	DRIVER 06	PASSENGER U02
HH	12 3/4	DNA
HW	20 5/16	DNA
HS	DNA	26 3/8
CD	18 3/4	19 1/4
CS	10 9/16	DNA
KDL	2 3/8	4 5/8
KDR	3	5 7/16

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy's torso contacted the driver's inner door panel and the head went through the driver's window, which broke on impact, and grazed the fixed, rigid pole. The dummy then rebounded from the driver's door with its head striking the windshield, possibly causing the windshield to break. The dummy continued to move across the front occupant compartment and landed in the passenger seat. Final resting position showed the dummy's buttocks in the passenger seat and the torso facing the driver's side. The legs were extended across the occupant compartment with the left leg on the driver's seat and the right foot on the driver's side floor. The dummy's head was resting on the passenger's seat back and the inside window sill.

PASSENGER

The passenger dummy began in an upright position, centered behind the driver with the feet placed under the driver's seat. During impact, the dummy's torso hit the inner quarter panel and the B-Pillar and the left side of the head hit the side header and the side window. The dummy's motion continued as the head and left shoulder went through the side window and came outside the vehicle. The dummy came to rest with the torso resting against the left window sill, leaving the left shoulder and head sticking outside of the vehicle through the left rear window. The dummy's feet remained underneath the driver's seat.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

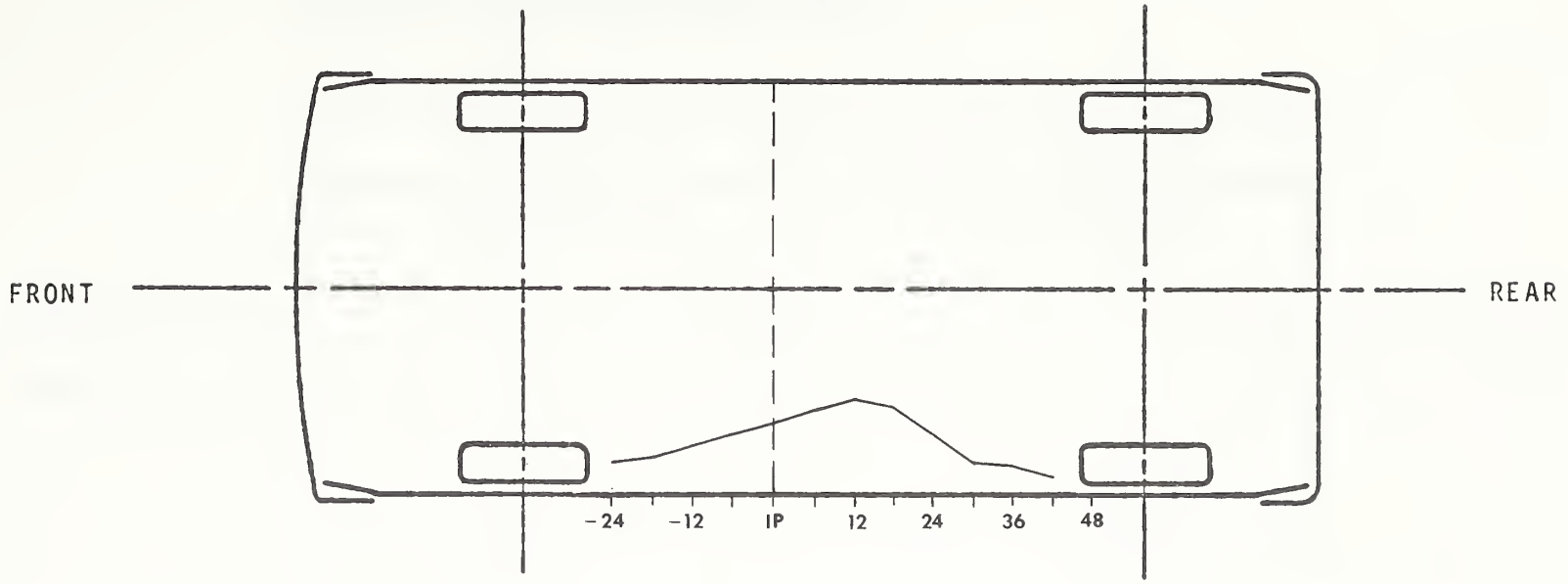
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	-24	-18	-12	-6	0	6	12	18	24	30	36	42	48	54	60
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.5	19.6	20.0	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.5	X	X	X
H-Point	20.3	18.0	18.0	18.0	17.9	17.8	17.8	17.8	17.8	17.8	17.8	18.0	18.0	X	X	X
Mid Door	23.3	17.8	17.8	17.8	17.8	17.6	17.5	17.5	17.5	17.5	17.6	17.8	17.8	18.0	X	X
Window Sill	34.0	19.5	19.5	19.3	19.3	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.3	19.4	X	X
Window Top	52.0	X	X	X	26.8	26.5	26.3	26.3	26.0	26.0	26.0	26.3	26.5	26.8	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.5	24.0	25.3	26.9	28.6	30.5	32.5	34.0	33.0	28.8	24.5	24.0	22.0	X	X	X
H-Point	20.3	22.0	23.0	25.3	27.8	30.5	32.9	34.5	33.8	29.0	24.8	22.8	21.3	X	X	X
Mid Door	23.3	21.8	22.6	25.0	27.6	30.3	33.0	34.8	34.0	29.5	25.0	22.8	21.4	20.4	X	X
Window Sill	34.0	22.8	23.4	25.3	27.5	29.9	32.4	35.0	35.3	31.5	27.5	23.8	21.8	21.5	X	X
Window Top	52.0	X	X	X	31.0	31.5	33.8	36.5	37.1	34.8	31.1	29.8	29.3	29.3	X	X
STATIC CRUSH (IN)																
Axle Height	10.5	4.4	5.3	7.1	8.8	10.7	12.7	14.2	13.2	9.0	4.7	4.2	2.5	X	X	X
H-Point	20.3	4.0	5.0	7.3	9.9	12.7	15.1	16.7	16.0	11.2	7.0	4.8	3.3	X	X	X
Mid Door	23.3	4.0	4.8	7.2	9.8	12.7	15.5	17.3	16.5	12.0	7.4	5.0	3.6	2.4	X	X
Window Sill	34.0	3.3	3.9	6.0	8.2	10.9	13.4	16.0	16.3	12.5	8.5	4.8	2.5	2.1	X	X
Window Top	52.0	X	X	X	4.2	5.0	7.5	10.2	11.1	8.8	5.1	3.5	2.8	2.5	X	X

* Projected impact point is 9 inches forward of driver's side wheelbase midpoint. Column readings are front to rear from left to right.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE

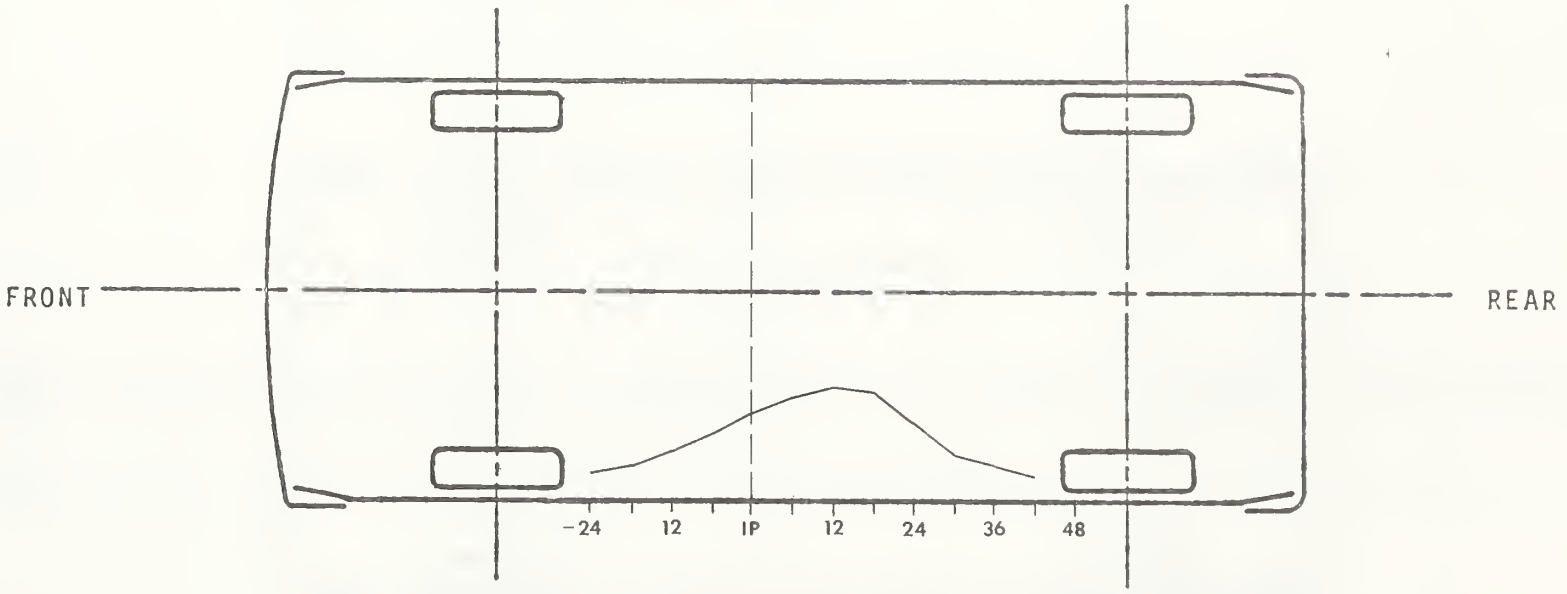


PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 63.5"
Length of Car = 153.8"

Maximum Crush = 14.3"
Length of Crush = 66.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

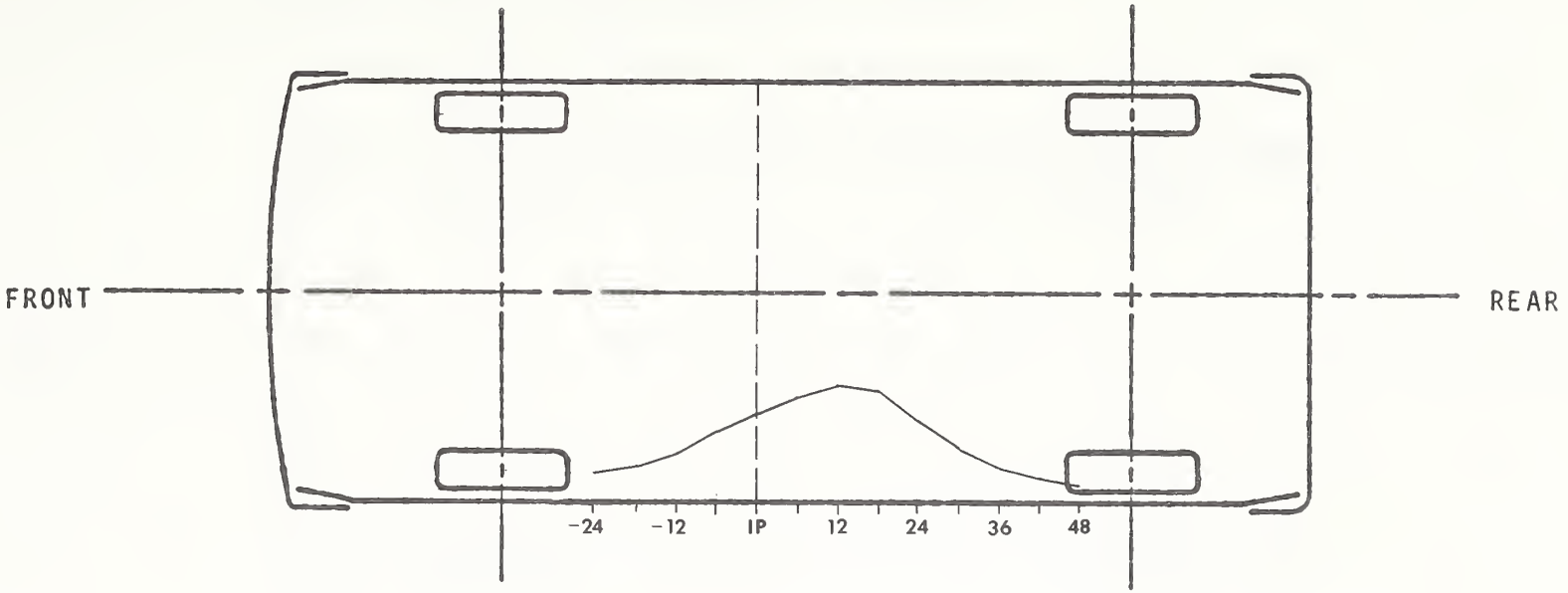


PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 63.5"
Length of Car = 153.8"

Maximum Crush = 16.8"
Length of Crush = 66.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

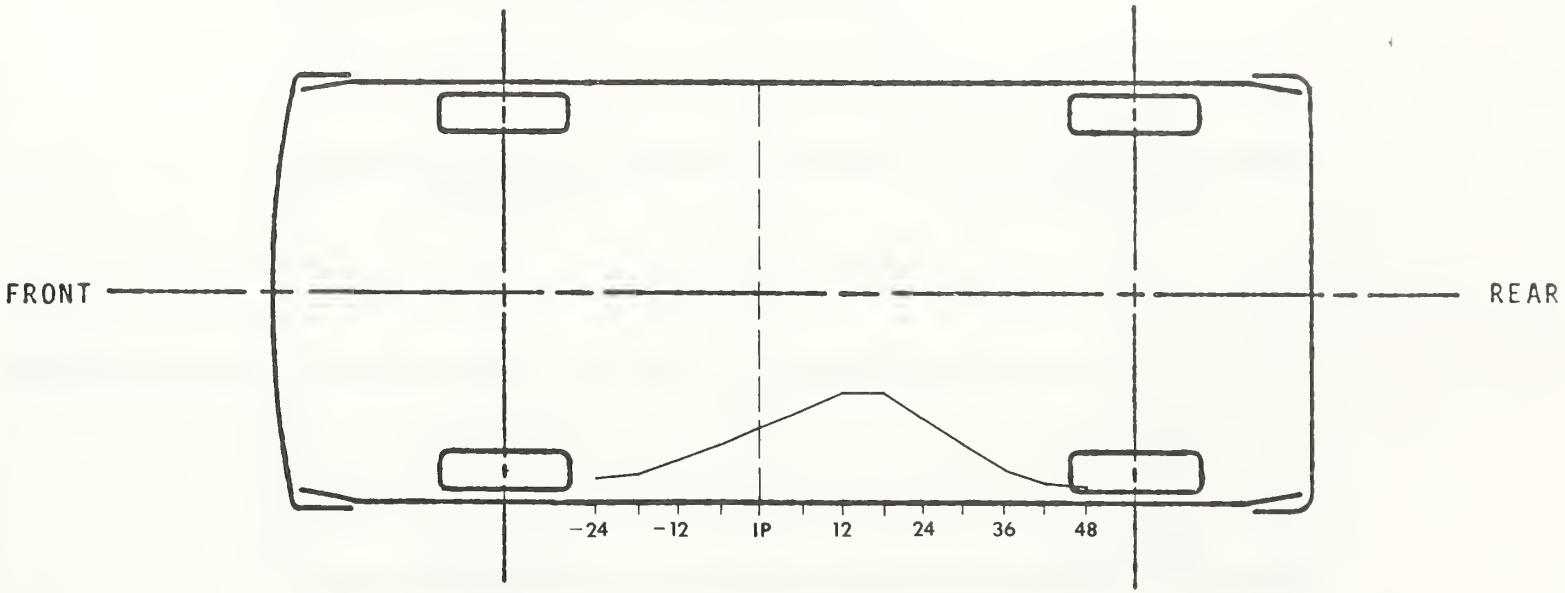


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 63.5"
Length of Car = 153.8"

Maximum Crush = 17.3"
Length of Crush = 72.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

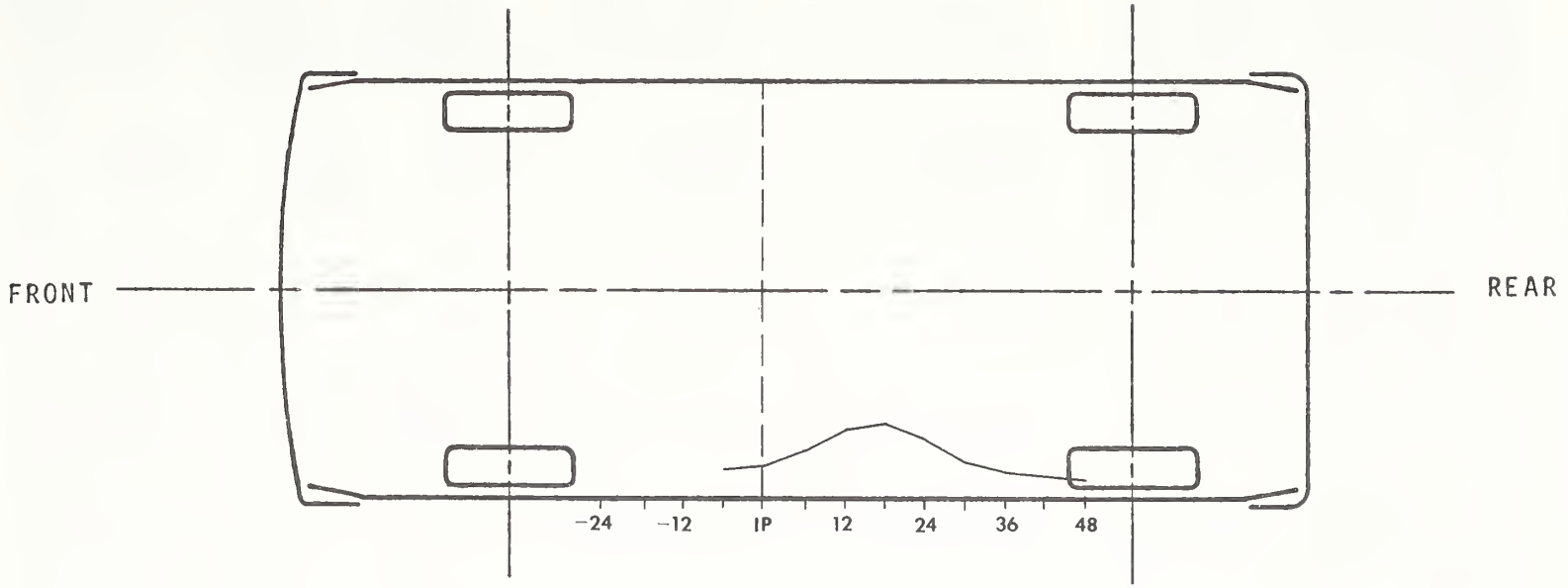


PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 63.5"
Length of Car = 153.8"

Maximum Crush = 16.3"
Length of Crush = 72.0"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 63.5"
Length of Car = 153.8"

Maximum Crush = 11.1"
Length of Crush = 54.0"

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION								
LONGITUDINAL	22.34	157.25	18.57	109.63	22.31	93.50	55.07	108.50
LATERAL	25.52	43.00	17.70	122.00	55.22	65.63	47.53	107.13
VERTICAL	3.52	23.63	31.96	62.50	41.37	91.63	39.26	109.25
RESULTANT		34.42 @ 63.75				76.89 @ 107.13		
HIC	152.30 from 39.62 to 169.50				512.60 from 60.88 to 136.75			
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	18.32	66.25	14.55	57.50	12.00	136.25	41.07	98.12
LATERAL (P)***	63.05	40.63	18.67	55.63	34.36	75.00	4.99	93.13
LATERAL (R)***	64.35	40.63	17.44	55.63	35.76	81.25	4.16	93.13
VERTICAL	10.69	65.63	1.94	38.75	11.54	67.50	15.42	98.75
RESULTANT (P)		63.06 @ 40.63				47.86 @ 98.75		
RESULTANT (R)		64.36 @ 40.63				48.07 @ 98.75		
DELTA V (MPH)****		23.1 @ 53.12 (P)				18.5 @ 108.13 (P)		
		23.7 @ 63.75 (R)				19.9 @ 108.75 (R)		
LOWER SPINE								
LONGITUDINAL	12.27	39.38	12.71	27.50	2.17	44.38	22.16	65.63
LATERAL (P)	72.90	35.63	11.93	55.63	35.45	73.13	11.21	108.13
LATERAL (R)	73.34	35.63	10.54	55.63	38.03	83.12	9.29	98.75
VERTICAL	7.63	31.88	---	--- ε	14.55	68.13	9.41	99.37
RESULTANT (P)		73.24 @ 35.63				41.38 @ 81.88		
RESULTANT (R)		73.67 @ 35.63				44.20 @ 82.50		
DELTA V (MPH)		26.2 @ 52.50 (P)				24.6 @ 96.25 (P)		
		25.9 @ 53.12 (R)				25.8 @ 95.62 (R)		
LEFT UPPER RIB								
LATERAL (P)	50.55	23.13	4.46	68.13	42.83	81.25	6.18	63.12
LATERAL (R)	51.04	23.13	3.25	68.75	40.75	81.25	6.92	63.12
DELTA V (MPH)		22.5 @ 76.25 (P)				23.6 @ 110.62 (P)		
		22.7 @ 65.63 (R)				23.9 @ 110.62 (R)		
LEFT LOWER RIB								
LATERAL (P)	55.80	21.25	21.96	60.62	40.50	83.12	8.96	111.25
LATERAL (R)	58.07	21.25	20.23	60.62	41.96	82.50	7.08	110.62
DELTA V (MPH)		21.5 @ 72.50 (P)				24.8 @ 108.12 (P)		
		22.2 @ 71.25 (R)				24.9 @ 108.12 (R)		
PELVIS ACCELERATION								
LONGITUDINAL	4.48	48.13	21.85	52.88	2.92	30.75	32.09	67.13 ○
LATERAL	55.37	32.75	8.71	53.50	44.64	75.00 ○	20.35	59.88
VERTICAL	8.60	58.00	5.68	24.38	12.39	80.88	2.73	105.13
RESULTANT		55.38 @ 32.75				56.67 @ 76.25 ○		
DELTA V (MPH)		21.9 @ 51.13				29.8 @ 135.50 ○		

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION †	1.86	56.00	---	--- ε	0.78	95.88	---	--- ε

* LONGITUDINAL:	FORWARD	**LONGITUDINAL:	REARWARD
LATERAL:	RIGHTWARD	LATERAL:	LEFTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD

*** (P) = Primary Sensor, (R) = Redundant Sensor

**** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

† Compression: Positive

ε There were no negative values in the time interval of interest.

o The CTM has judged that intermittent rattling has occurred in these channels and, therefore, the peak values reported are questionable as are applicable resultants and Delta V's.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

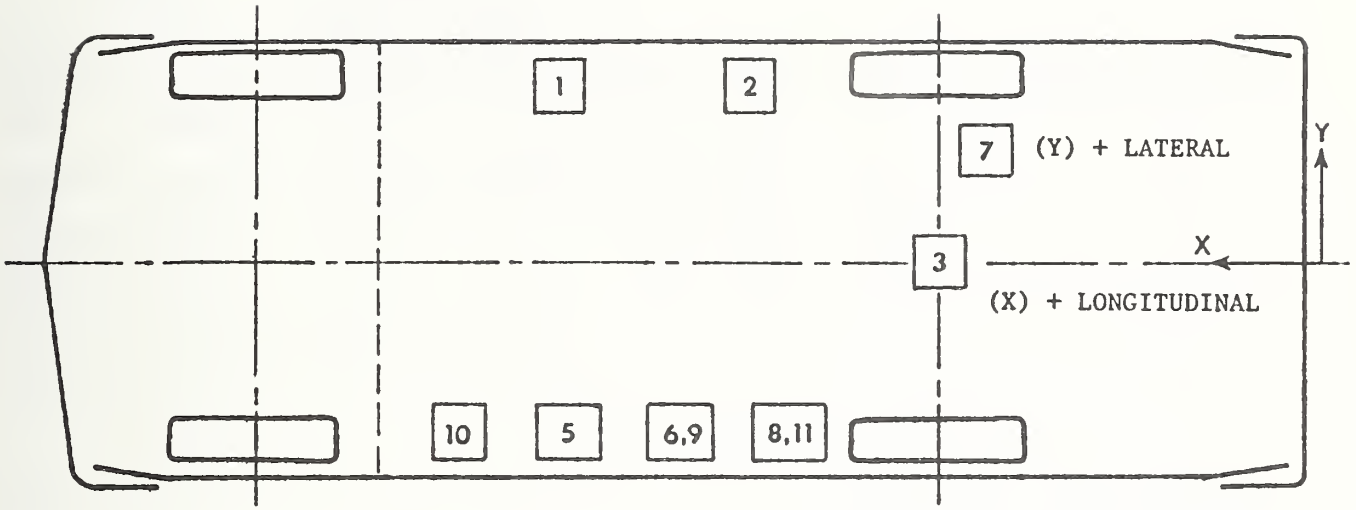
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	RIGHT SILL AT FRONT SEAT	83.4	23.4	11.3				
	(LONGITUDINAL)	ΔV = -9.6 mph @ 145.00 msec			2.06	53.75	9.87	60.00
	(LATERAL)	ΔV = 11.7 mph @ 145.00 msec			16.06	54.88	1.89	80.88
	(VERTICAL)				6.47	48.88	3.35	108.13
	(RESULTANT)					16.26 @ 38.88		
2	RIGHT SILL AT REAR SEAT	61.4	23.7	9.4				
	(LONGITUDINAL)	ΔV = -9.0 mph @ 145.00 msec			1.03	134.13	8.17	65.00
	(LATERAL)	ΔV = 15.4 mph @ 145.00 msec			20.14	38.88	2.63	95.13
	(VERTICAL)				5.08	63.50	4.16	108.00
	(RESULTANT)					20.64 @ 39.00		
3	REAR DECK OVER AXLE	32.0	0.0	6.1				
	(LONGITUDINAL)	ΔV = -12.2 mph @ 145.00 msec			2.27	121.38	13.93	82.13
	(LATERAL)	ΔV = 24.7 mph @ 145.00 msec			18.60	67.75	2.10	134.38
	(VERTICAL)				4.26	20.13	4.73	101.75
	(RESULTANT)					21.65 @ 67.75		
4	LEFT SILL AT REAR SEAT	61.0	-23.6	8.6				
	(LATERAL)	ΔV = 16.9 mph @ 59.38 msec			38.64	46.88	11.25	65.75
5	LEFT SILL AT FRONT SEAT	83.4	-23.3	10.7				
	(LATERAL)	ΔV = ---		--- τ	34.40	24.88	22.49	32.25
6	LEFT FRONT DOOR CENTERLINE	80.3	-26.0	22.9				
	(LATERAL)	ΔV = ---		--- τ	149.03	13.63	52.37	34.63
7	RIGHT REAR COMPARTMENT	31.0	-15.4	13.8				
	(LONGITUDINAL)				2.06	125.00	11.35	68.75
8	MIDREAR OF LEFT FRONT DOOR	60.1	-26.2	22.9				
	(LATERAL)	ΔV = 22.7 mph @ 54.75 msec			82.92	50.13	46.62	14.00
9	UPPER LEFT FRONT DOOR CENTERLINE	81.2	-26.0	31.9				
	(LATERAL)	ΔV = ---		--- τ	143.00	15.63	108.45	25.50
10	MIDFRONT OF LEFT FRONT DOOR	99.1	-25.9	22.0				
	(LATERAL)	ΔV = ---		--- τ	30.91	8.38	45.97	12.38
11	UPPER REAR OF LEFT REAR DOOR	70.2	26.1	31.9				
	(LATERAL)	ΔV = ---		--- τ	83.43	30.75	155.73	25.75

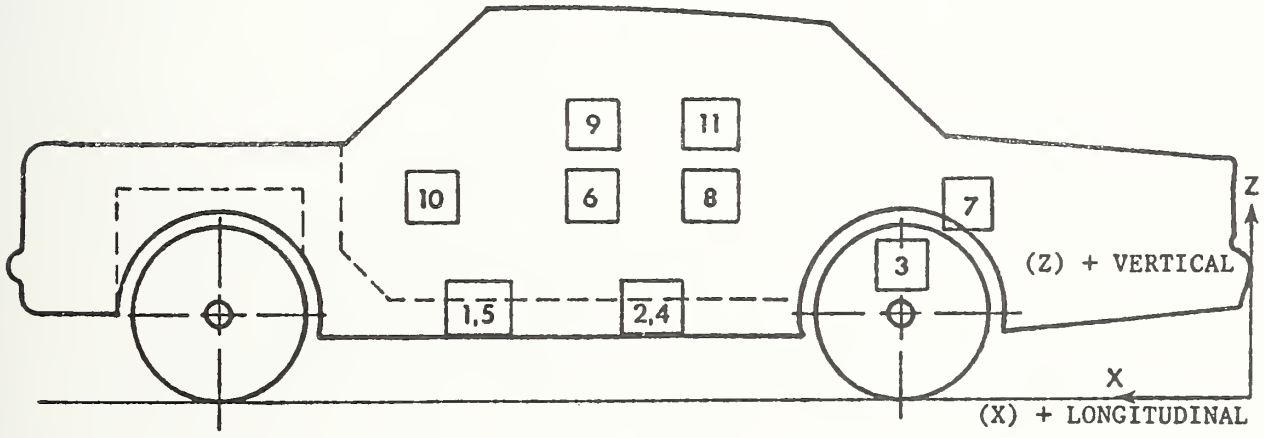
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right), Z - Ground Level (+ Up)

All measurements of accelerometer locations in inches.

τ This Delta V appears unrealistic

VEHICLE ACCELEROMETER LOCATIONS





FIXED POLE LOAD CELL LOCATIONS AND DATA SUMMARY

CELL NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX (lb)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (lb)	NEGATIVE DIRECTION TIME (msec)
1		17.75	-3.25	72.5	8002.45	76.13	10643.96	42.75
2		17.75	3.25	72.5	5790.47	29.13	15038.08	68.50
3		17.75	-3.25	4.0	---	---[x]	20076.66	38.25
4		17.75	3.25	4.0	2266.91	133.50	26261.08	67.50
TOTAL FORCE					---	---[x]	46401.70	50.13

*Reference Facing Pole Front
X - Pole Base (+ forward)
Y - Pole Centerline (+ right)
Z - Ground Level (+ up)

All location measurements are in inches.

Compression - Negative

[x]There were no positive values in the time interval of interest.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonic 1B	25	497	Impact point
2	Overhead	Photosonic 1B	13	500	Vehicle dynamics
3	Left Side	Photosonic 1B	13	450	Vehicle dynamics
4	Behind Pole	Photosonic 1B	25	520	Impact point
5	Onboard - Front	Photosonic 1B	8	800	Driver kinematics
6	Onboard - Driver Side	Photosonic 1B	8	792	Driver kinematics
7	Onboard - Back	Photosonic 1B	8	792	Passenger kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM. (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH AND CRASH EVENT SPLICED AT START AND END OF FILM.

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	-3' 1/2"	2"	17'3"
2	13'11"	10'3"	13'3"
3	-3'5"	-24'4"	52'1/2"
4	12'9"	5'3/4"	32'1/2"

Origin of Coordinate System is Point of Impact

+X = Forward of Impact Side of Pole with Respect to Striking Vehicle's Velocity Vector
+Y = Rightward from Centerline of Pole
+Z = Upward with Respect to Striking Vehicle's Velocity Vector

APPENDIX A

PHOTOGRAPHS

Figure A-1. PRE-TEST OVERALL - VIEW 1

Figure A-2. PRE-TEST OVERALL - VIEW 2

Figure A-3. PRE-TEST OVERALL - VIEW 3

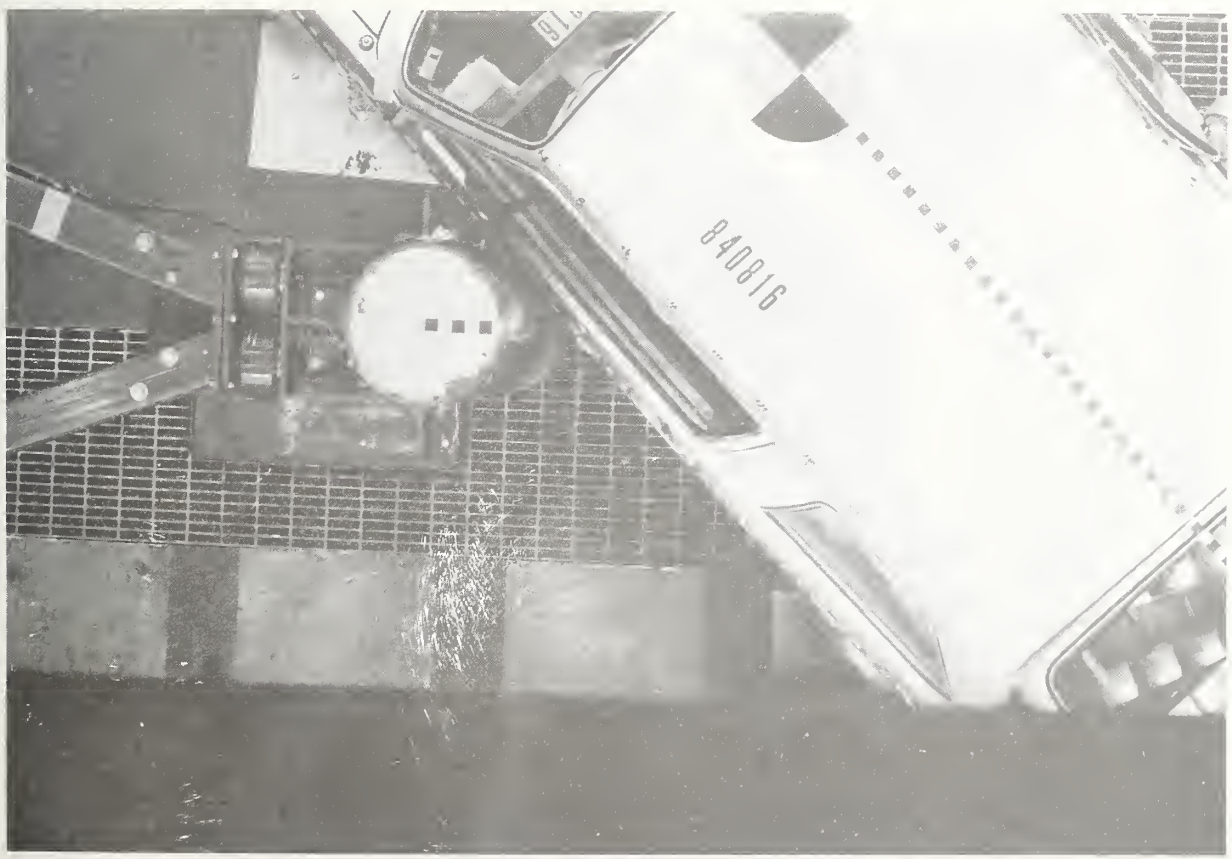


Figure A-4. PRE-TEST OVERALL - VIEW 4

Figure A-5. PRE-TEST CLOSEUP

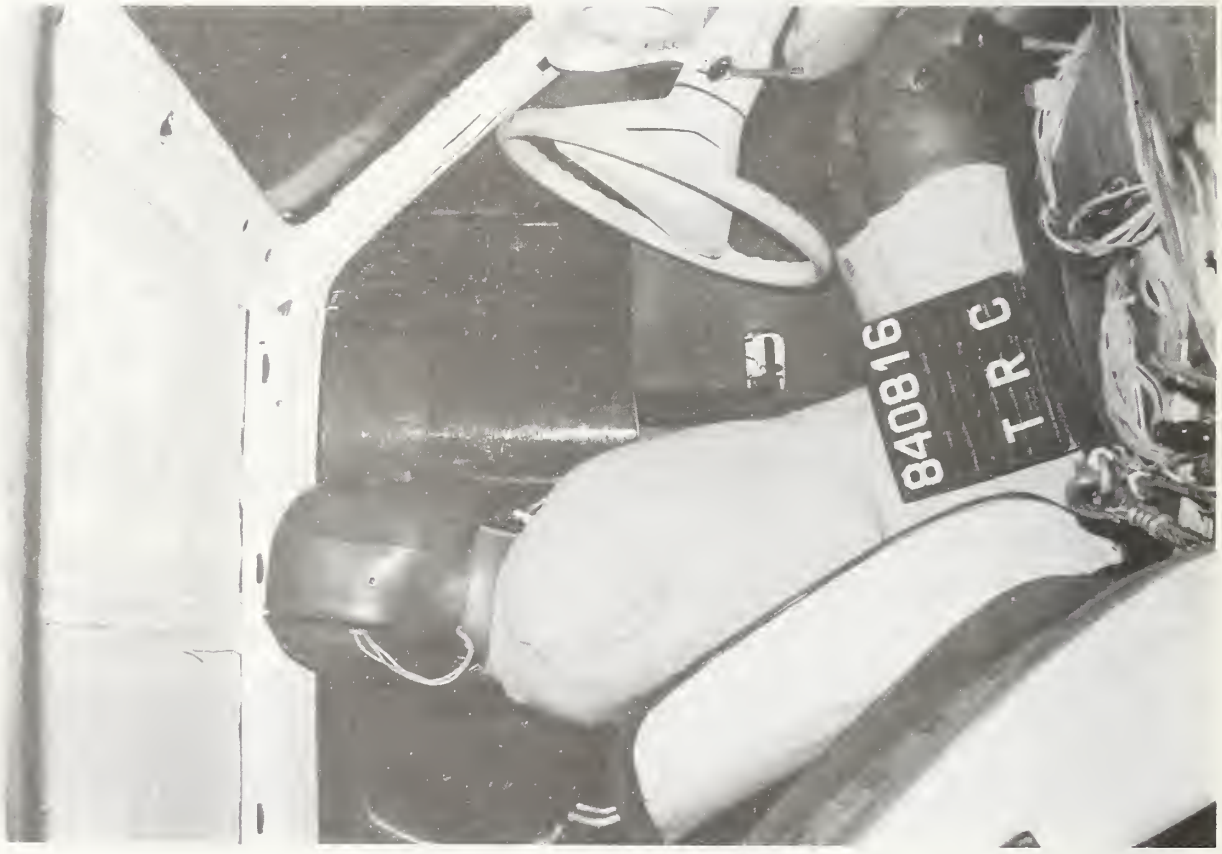


Figure A-6. PRE-TEST DRIVER DUMMY - VIEW 1

Figure A-7. PRE-TEST DRIVER DUMMY - VIEW 2

Figure A-8. PRE-TEST PASSENGER DUMMY - VIEW 1

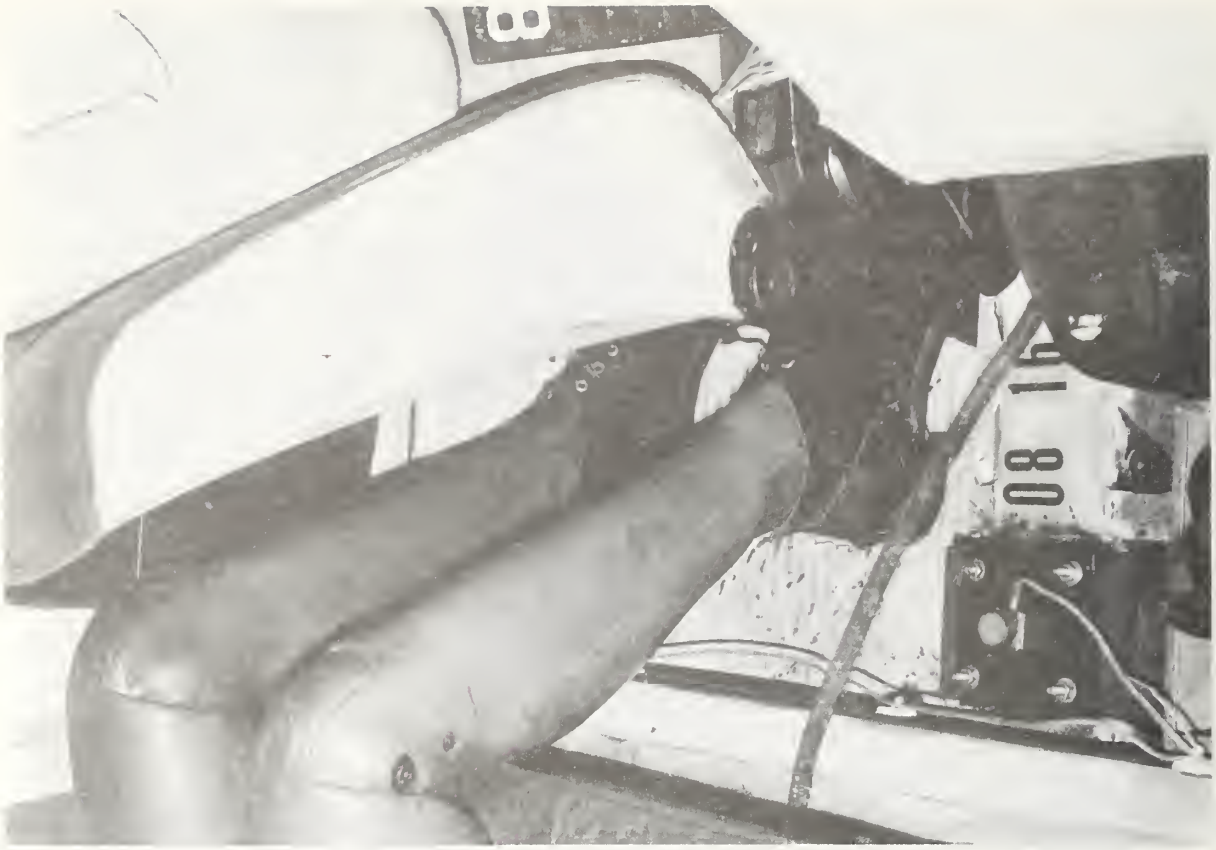


Figure A-9. PRE-TEST PASSENGER DUMMY - VIEW 2

Figure A-10. PRE-TEST DUMMIES OVERALL

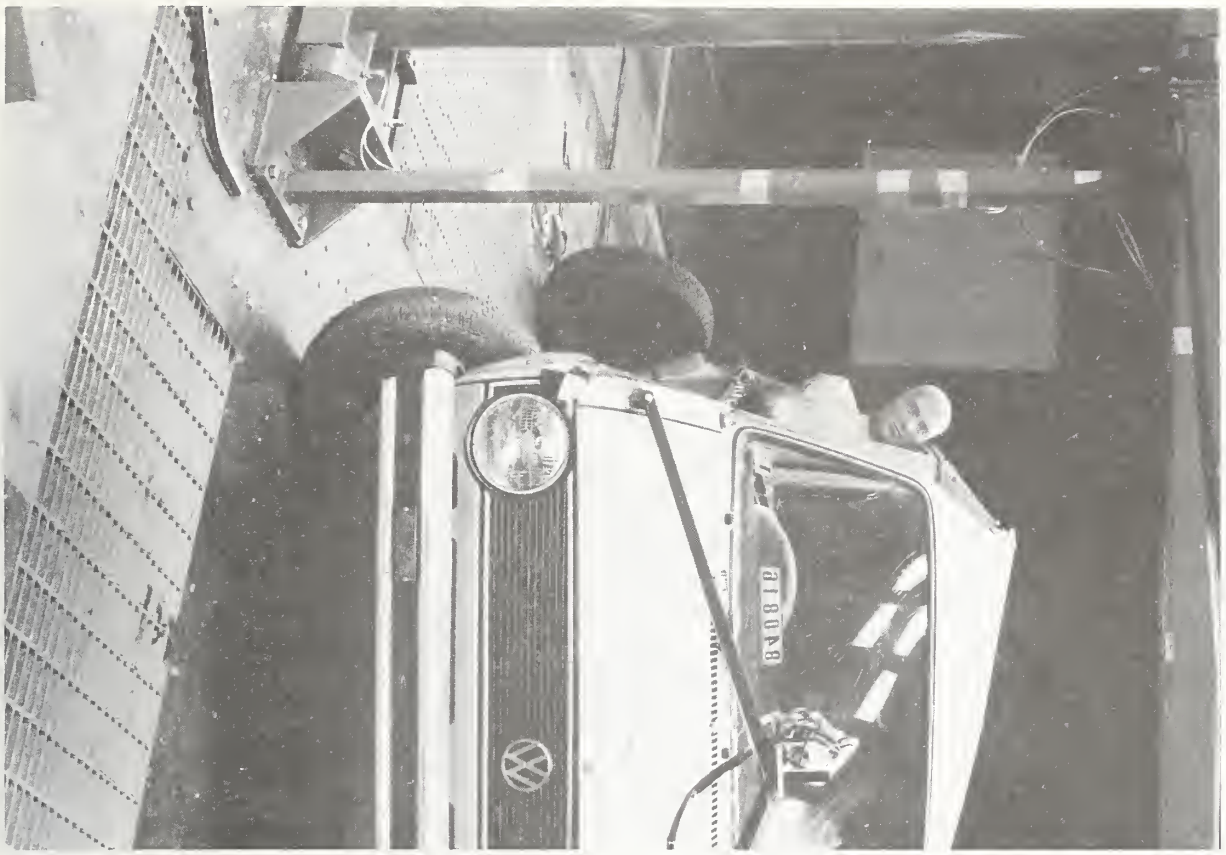


Figure A-11. POST-TEST OVERALL - VIEW 1

Figure A-12. POST-TEST OVERALL - VIEW 2

Figure A-13. POST-TEST OVERALL - VIEW 3

Figure A-14. POST-TEST OVERALL - VIEW 4

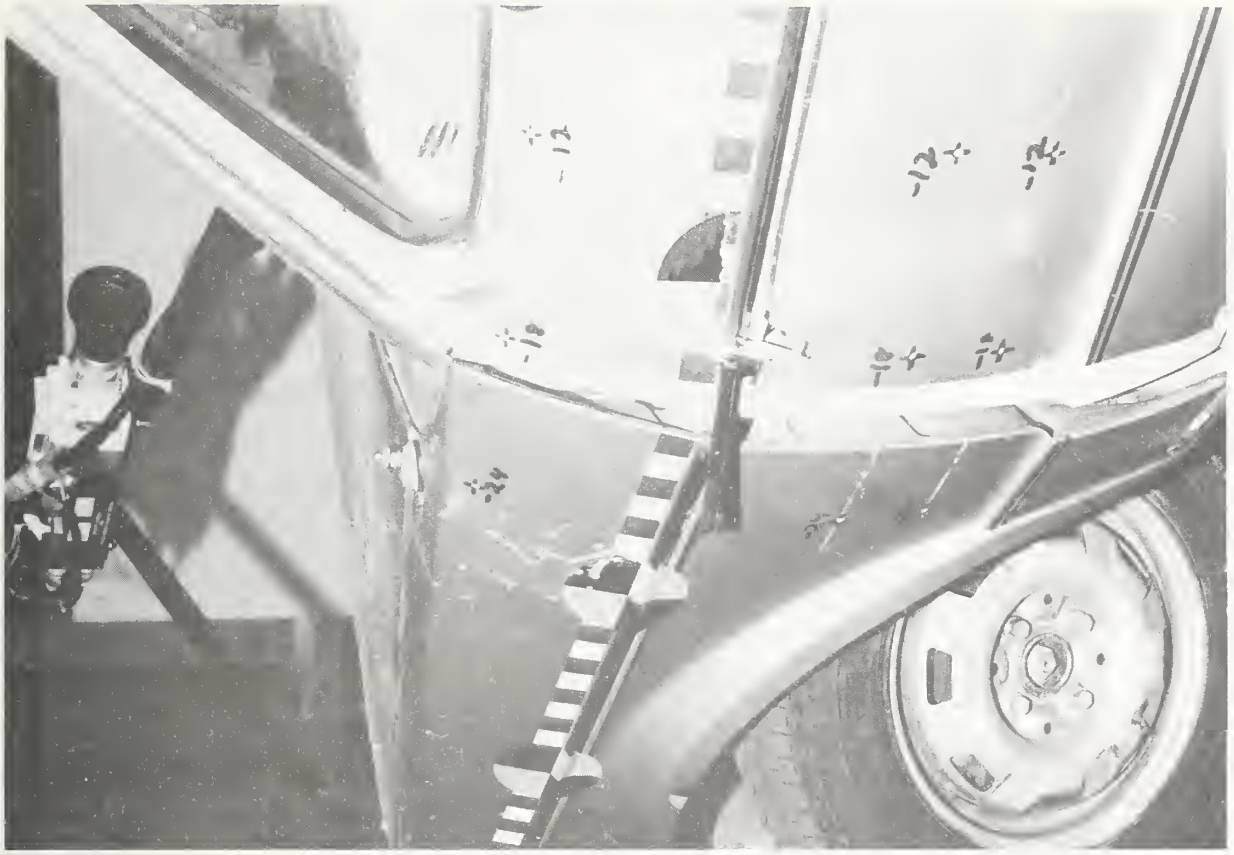


Figure A-15. POST-TEST CLOSEUP - VIEW 1

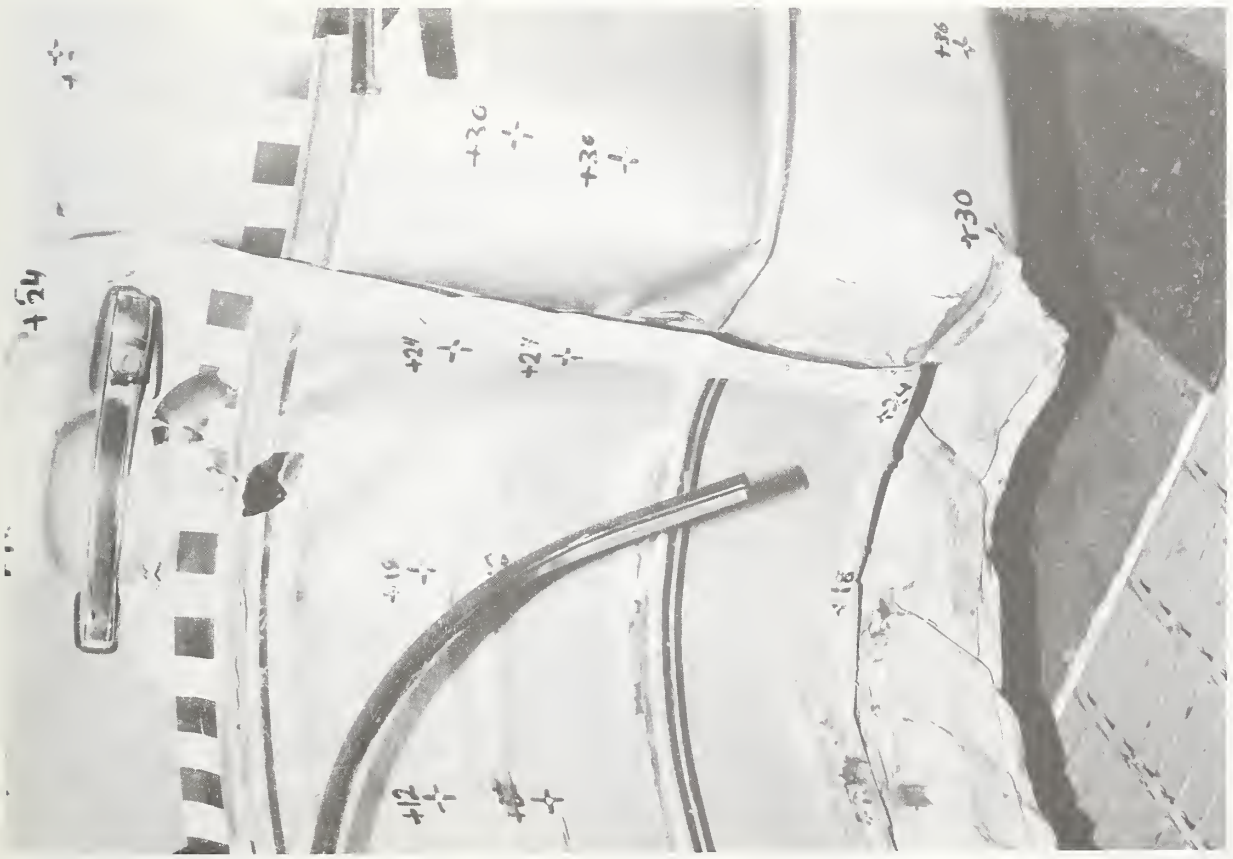


Figure A-16. POST-TEST CLOSEUP - VIEW 2

Figure A-17. POST-TEST DRIVER DUMMY - VIEW 1

Figure A-18. POST-TEST DRIVER DUMMY - VIEW 2

Figure A-19. POST-TEST DRIVER DUMMY - VIEW 3

Figure A-20. POST-TEST PASSENGER DUMMY - VIEW 1

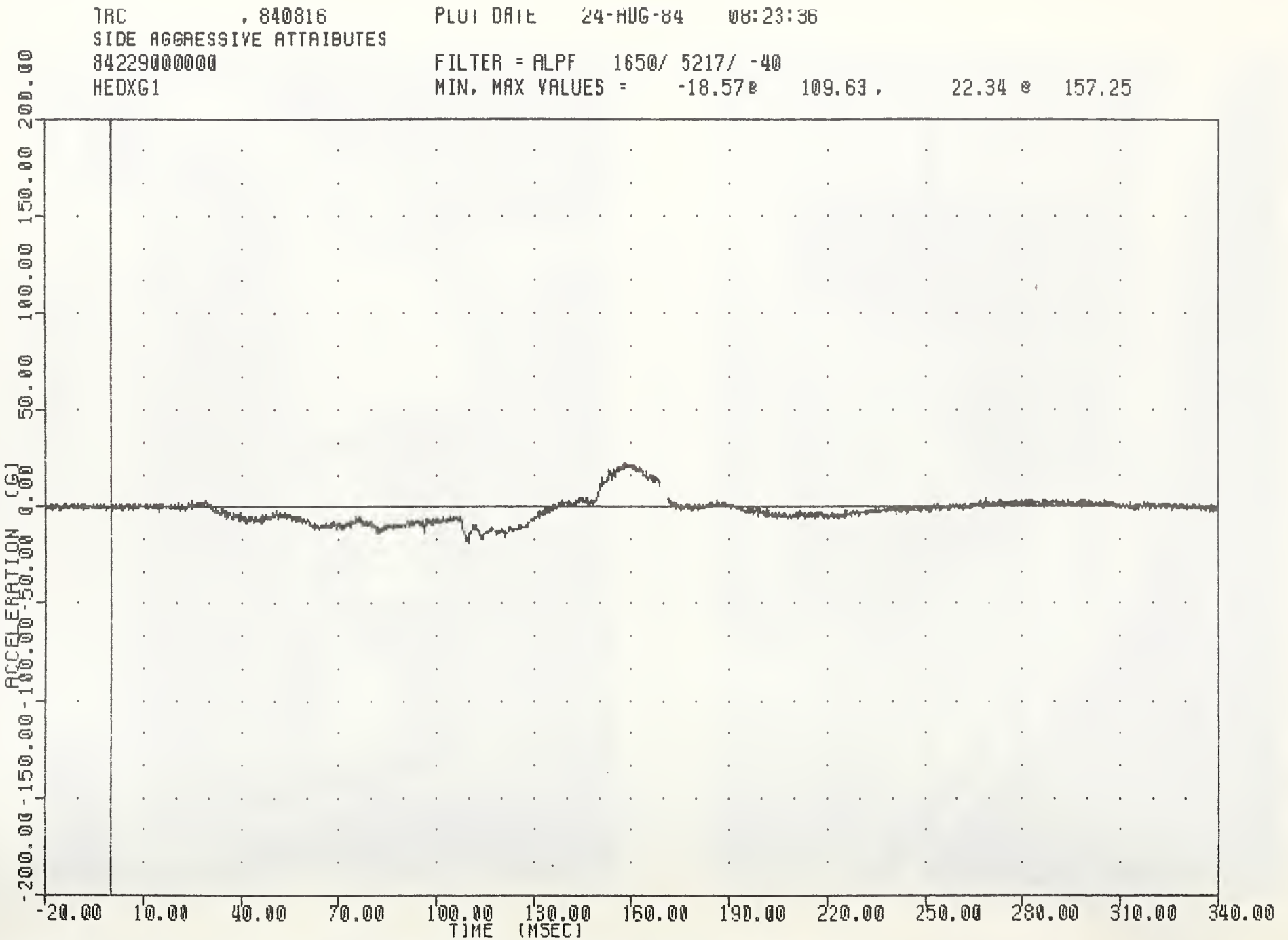
Figure A-21. POST-TEST PASSENGER DUMMY - VIEW 2

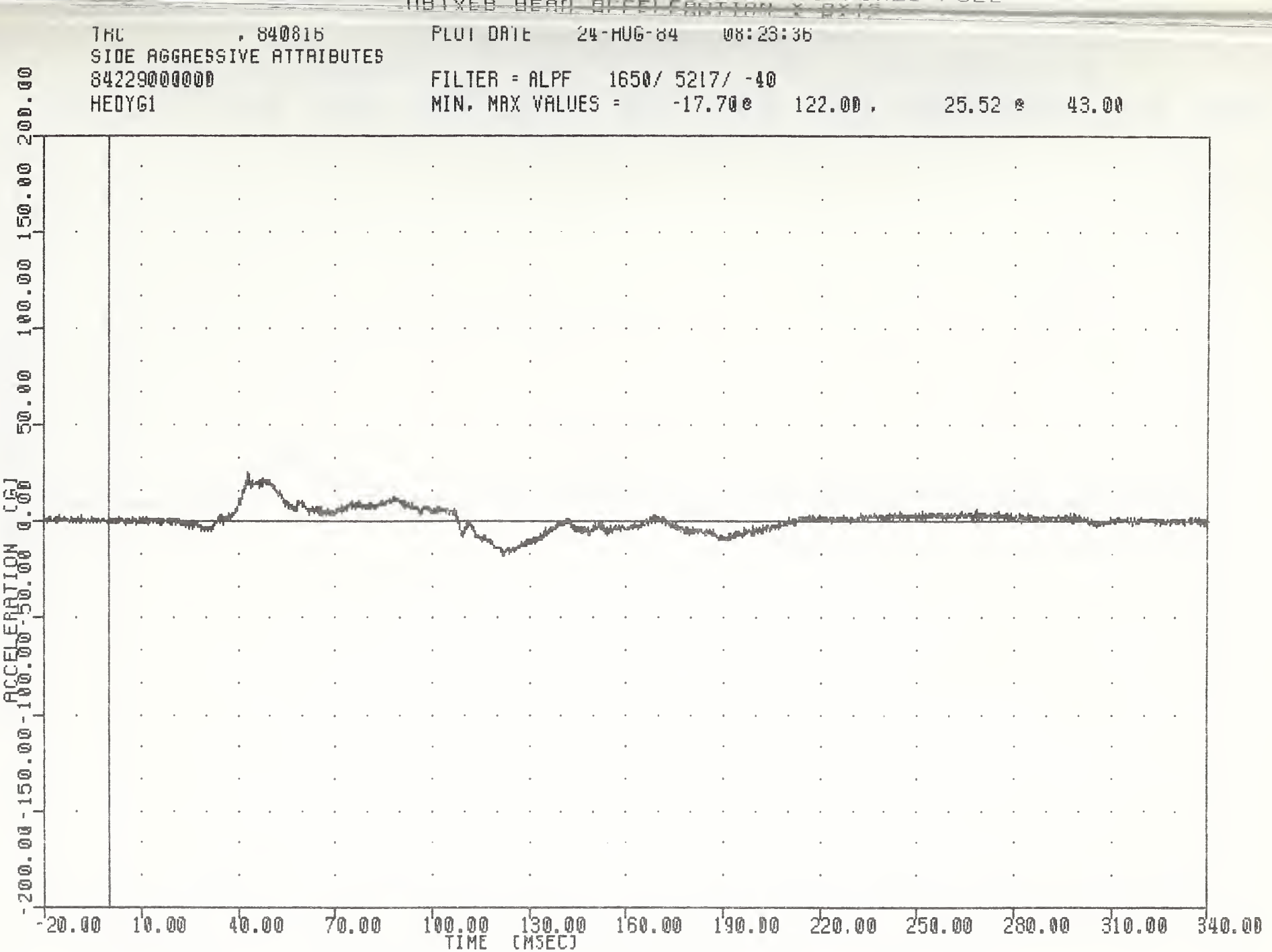
Figure A-22. POST-TEST DUMMIES OVERALL

APPENDIX B

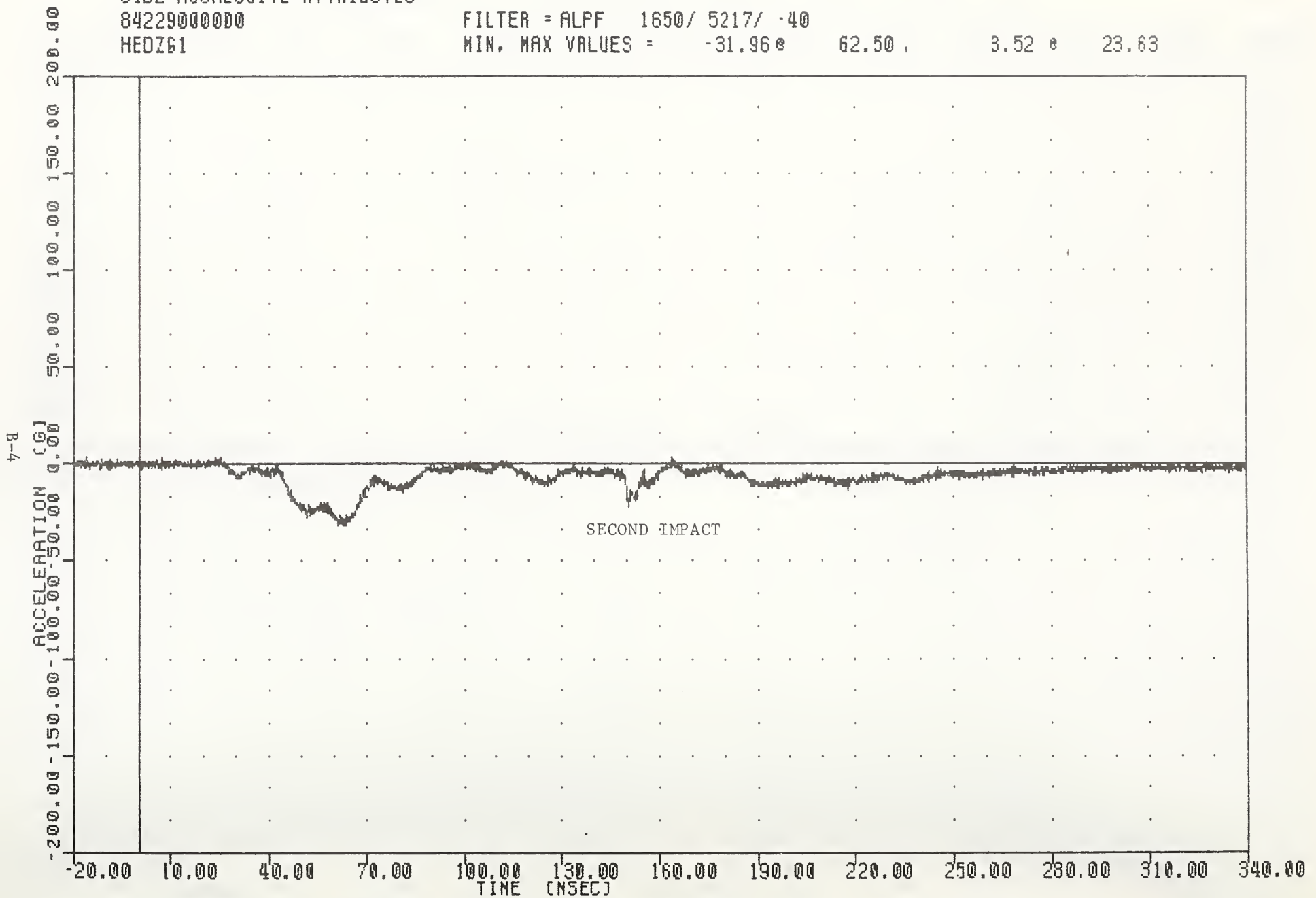
DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211, except dummy thorax data which was filtered using the HSRI filter.

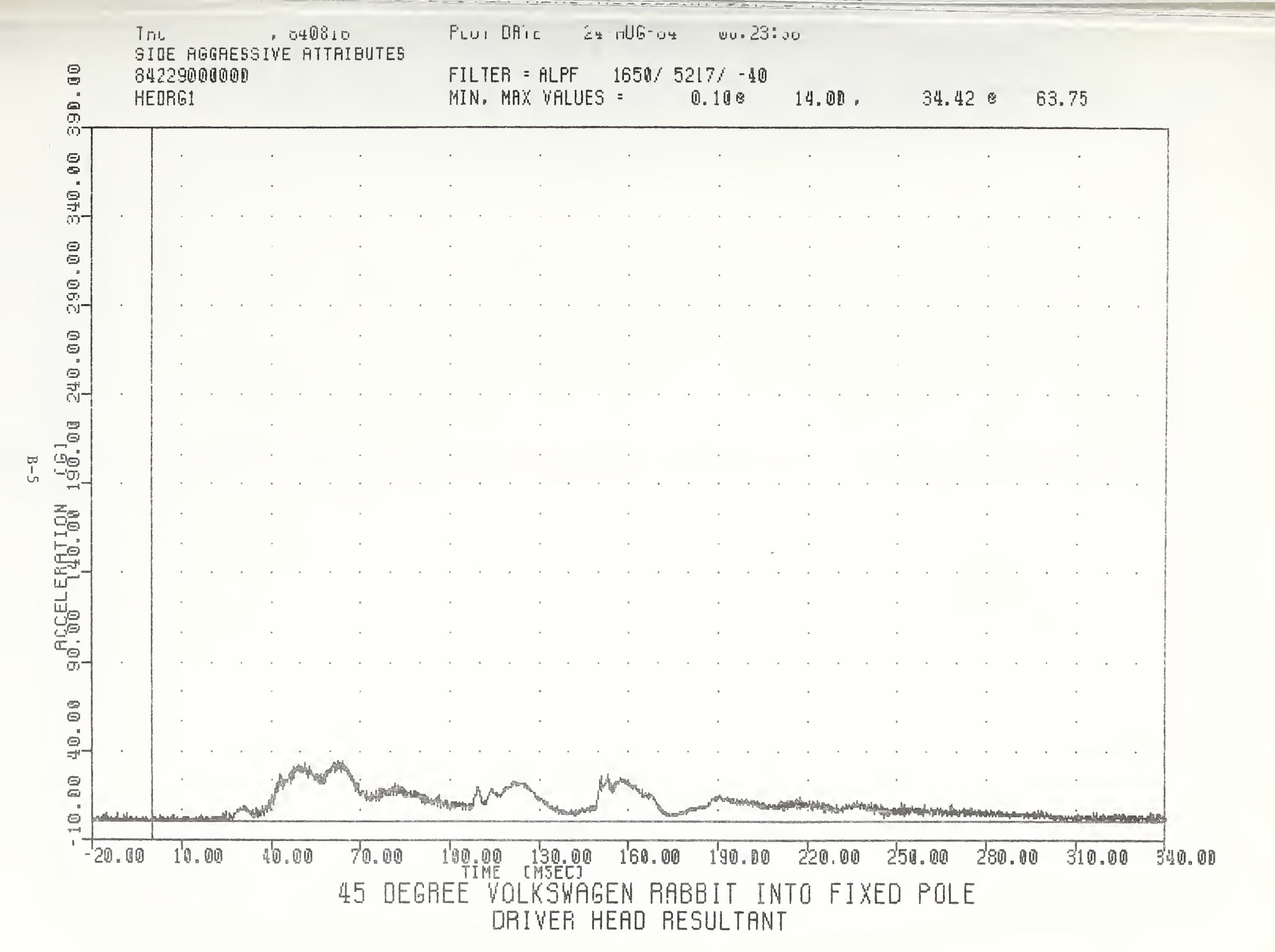

TRC , 840816
PLOT DATE 24-AUG-84 08:23:36
SIDE AGGRESSIVE ATTRIBUTES
84229000000
FILTER = ALPF 1650/ 5217/ -40
HEDXG1
MIN, MAX VALUES = -18.57 @ 109.63 , 22.34 @ 157.25
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER HEAD ACCELERATION X AXIS



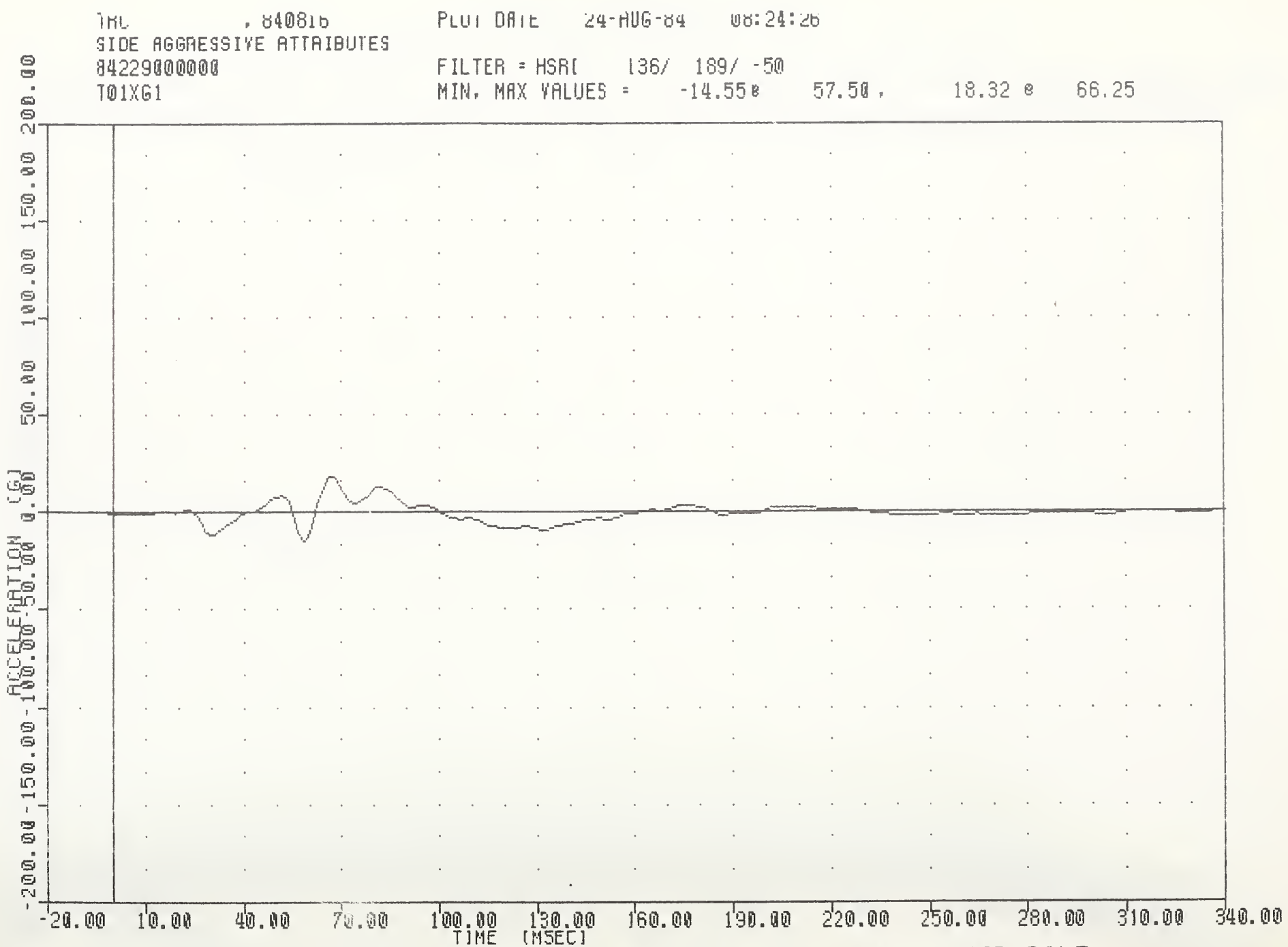
45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER HEAD ACCELERATION Y AXIS



45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER HEAD ACCELERATION Z AXIS

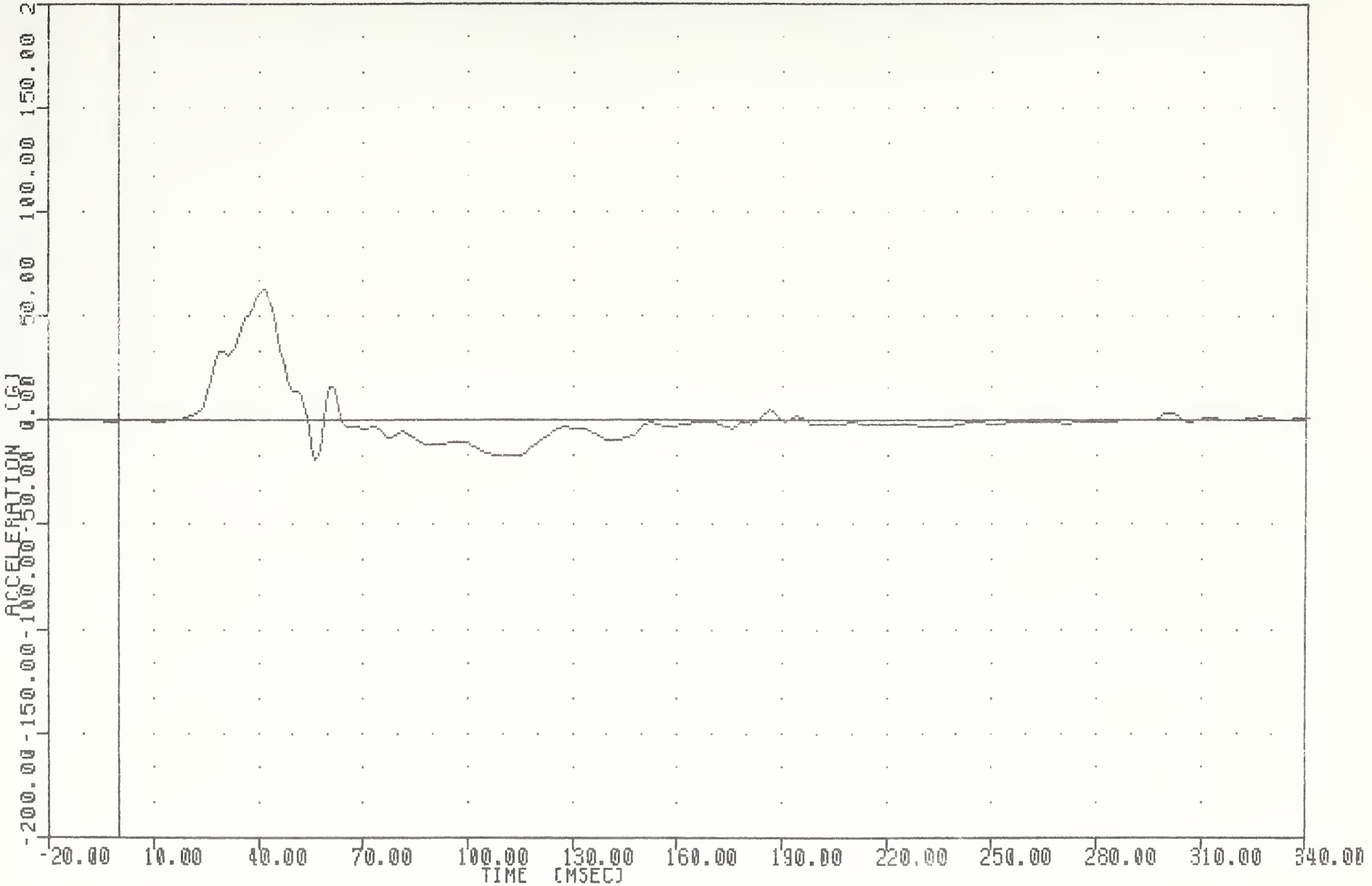


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER HEAD RESULTANT

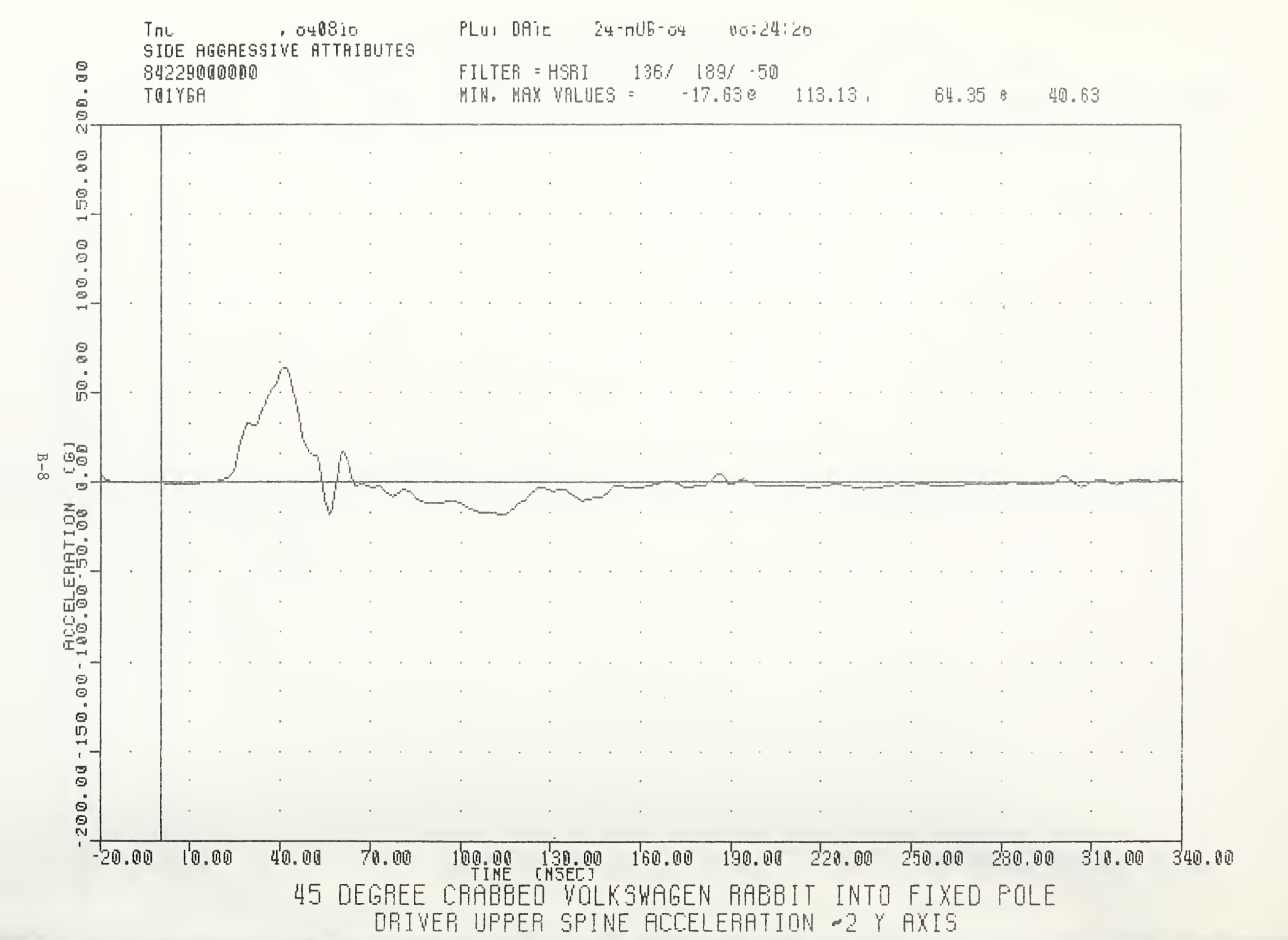


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE ACCELERATION X AXIS

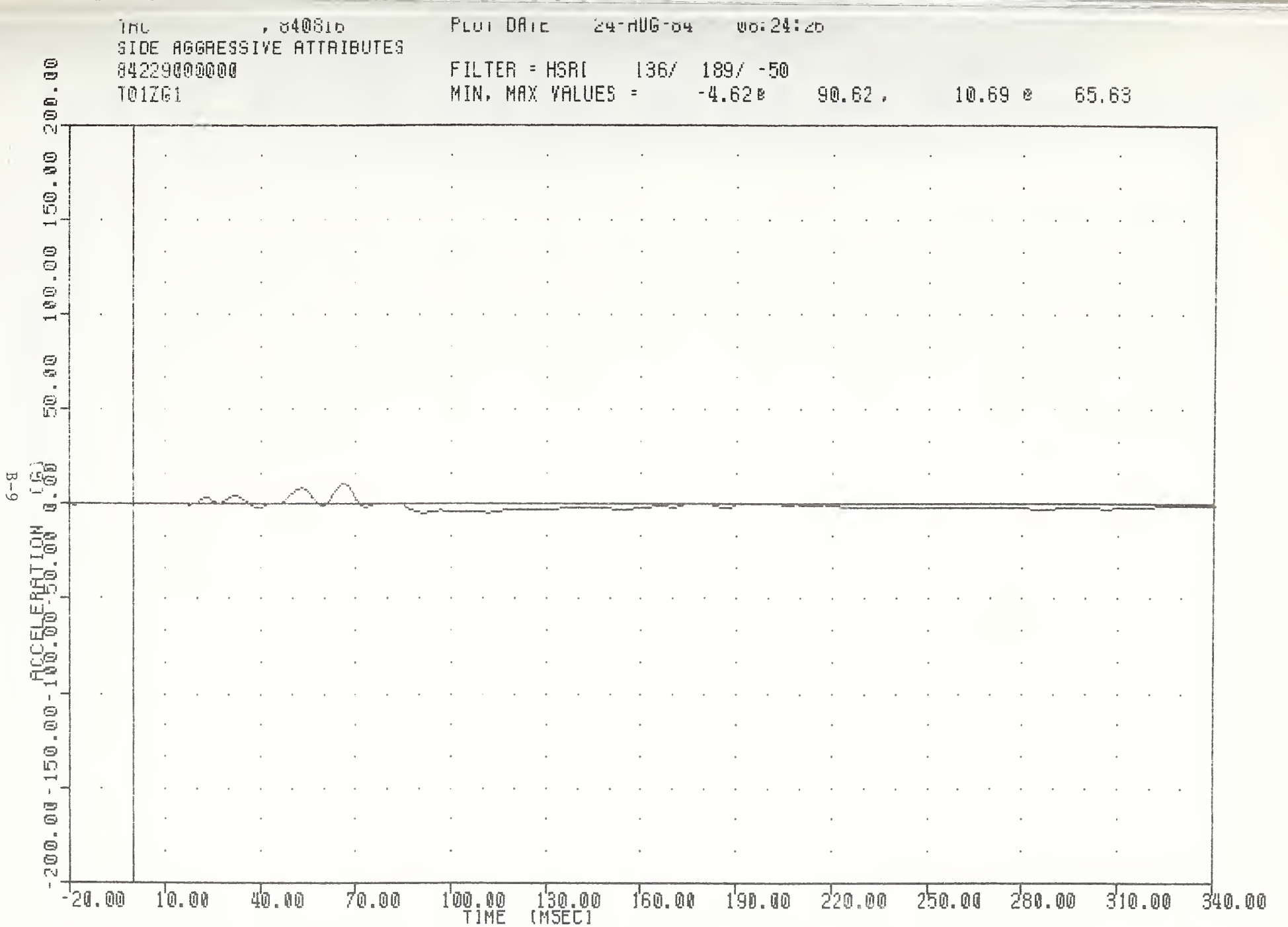
Inc , 040816 Plot Date 24-AUG-04 08:24:26
SIDE AGGRESSIVE ATTRIBUTES
84223000000 FILTER = HSRI 136/ 189/ -50
T01YG1 MIN, MAX VALUES = -18.67@ 55.63 , 63.05 @ 40.63



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE ACCELERATION Y AXIS

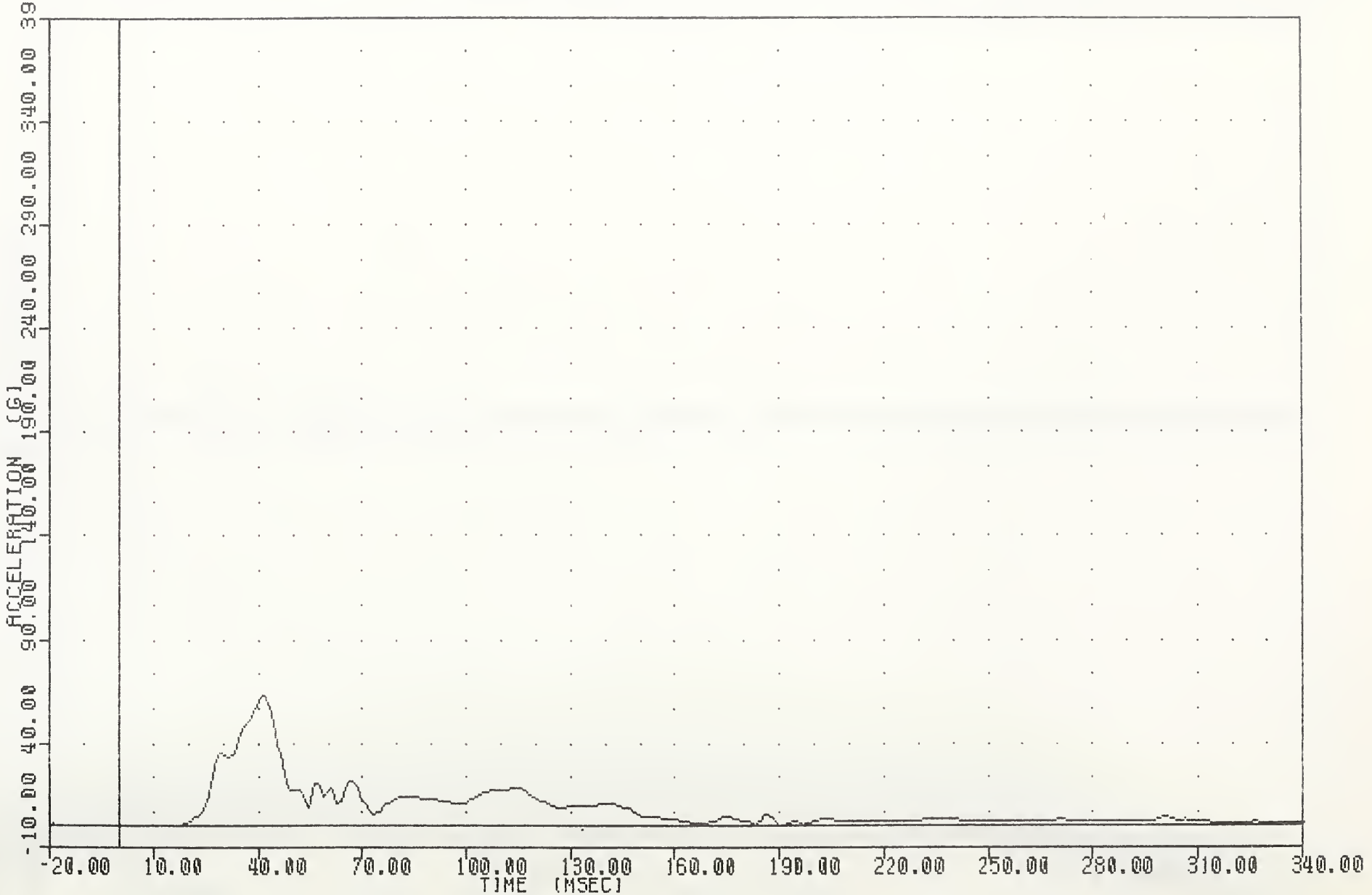


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE ACCELERATION -Z Y AXIS

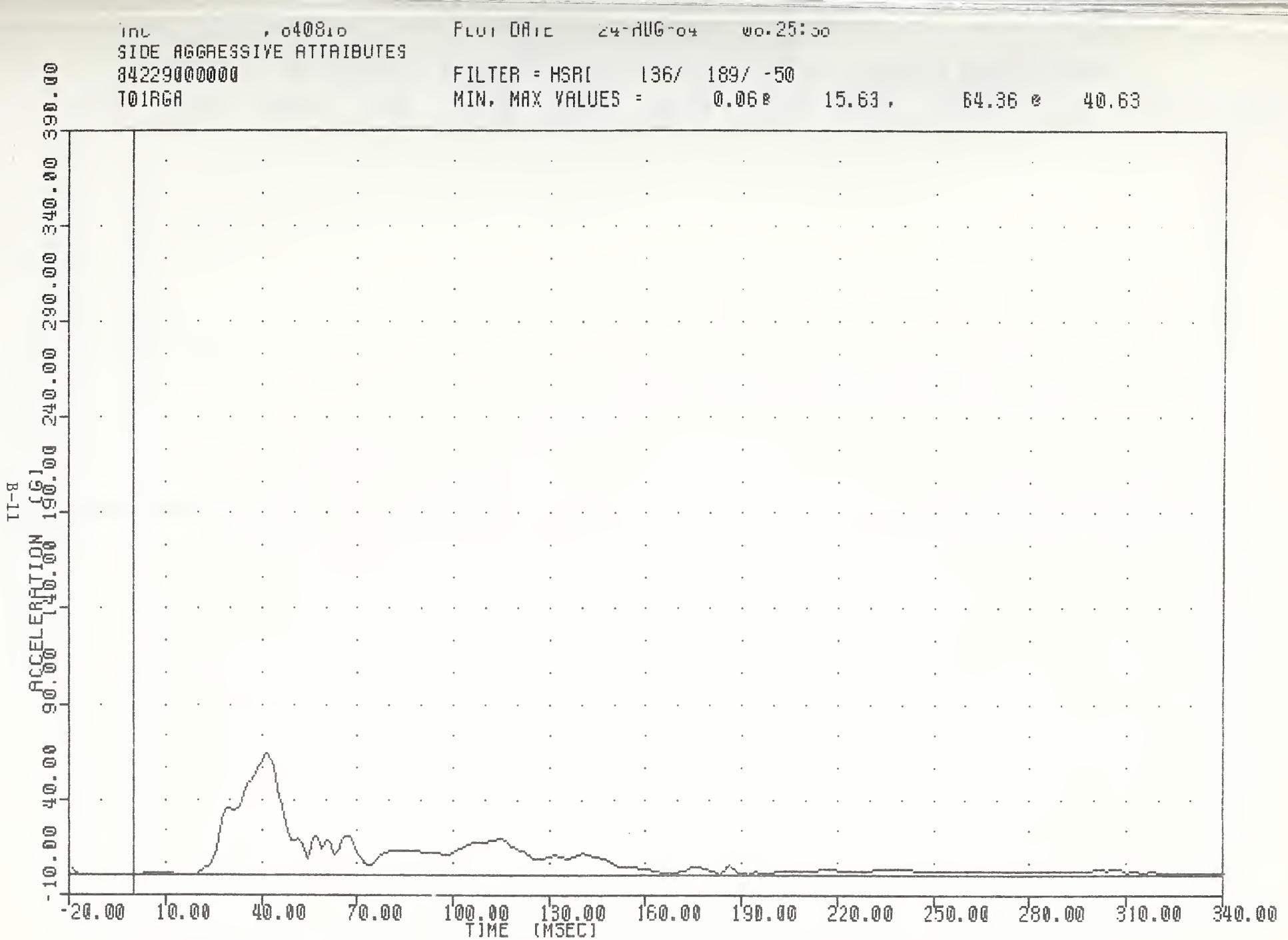


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE ACCELERATION Z AXIS

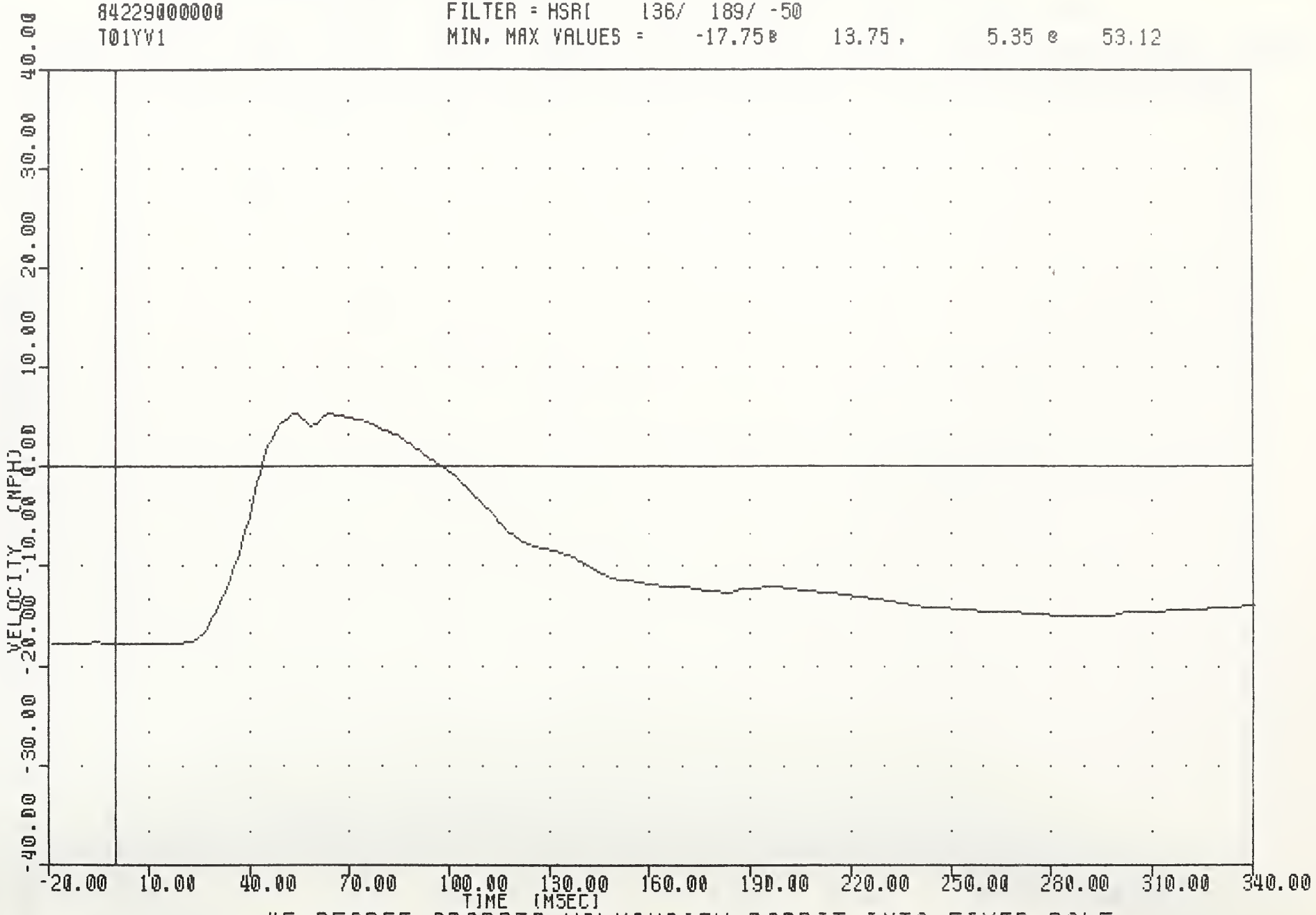
INC , 040810 PLOT DATE 24-AUG-04 00.24:20
SIDE AGGRESSIVE ATTRIBUTES
842290000000 FILTER = HSRI 136/ 189/ -50
T01RG1 MIN, MAX VALUES = 0.18 @ 15.63 , 63.06 @ 40.63



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE RESULTANT

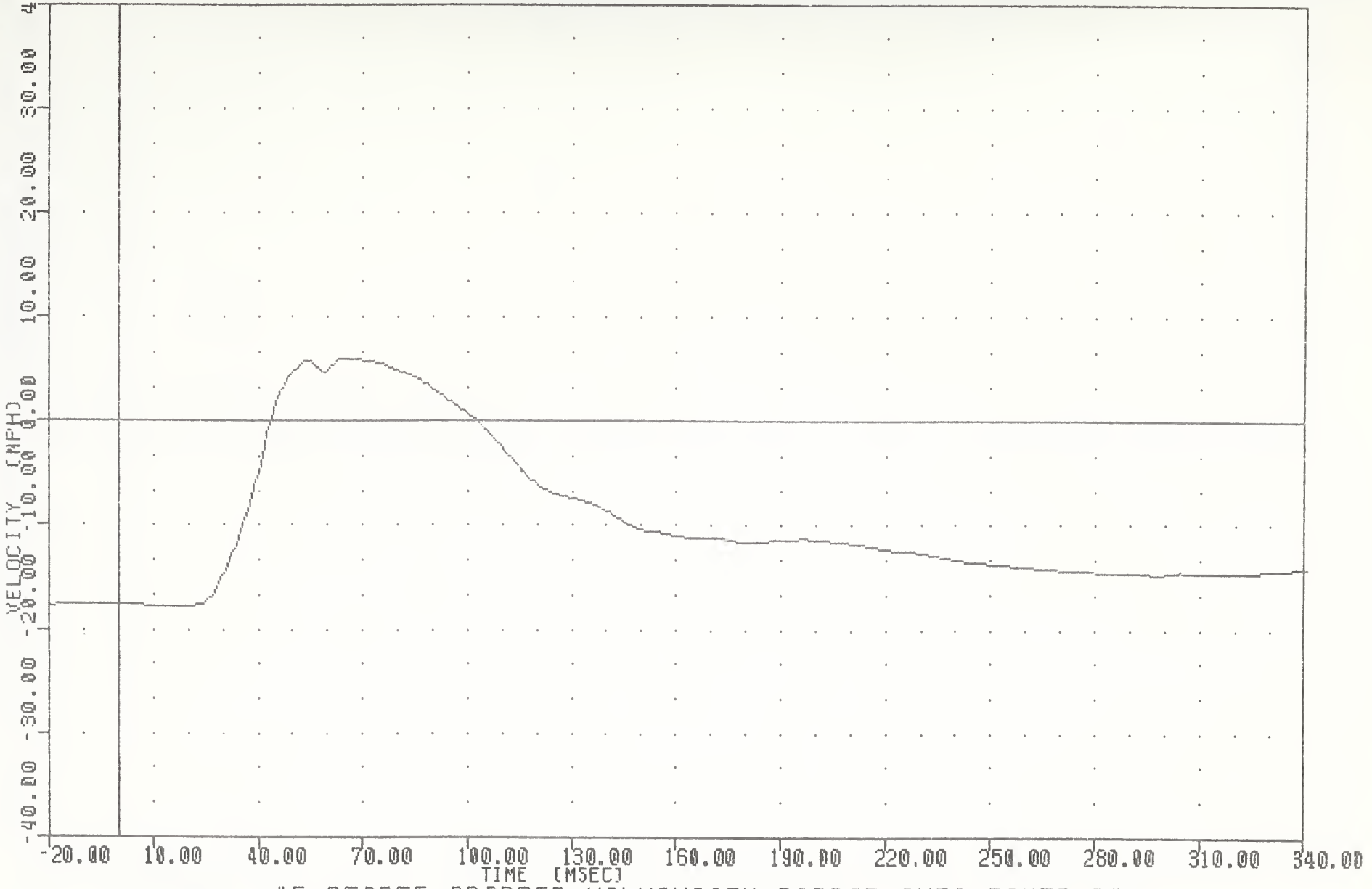


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER UPPER SPINE RESULTANT USING T01YGA

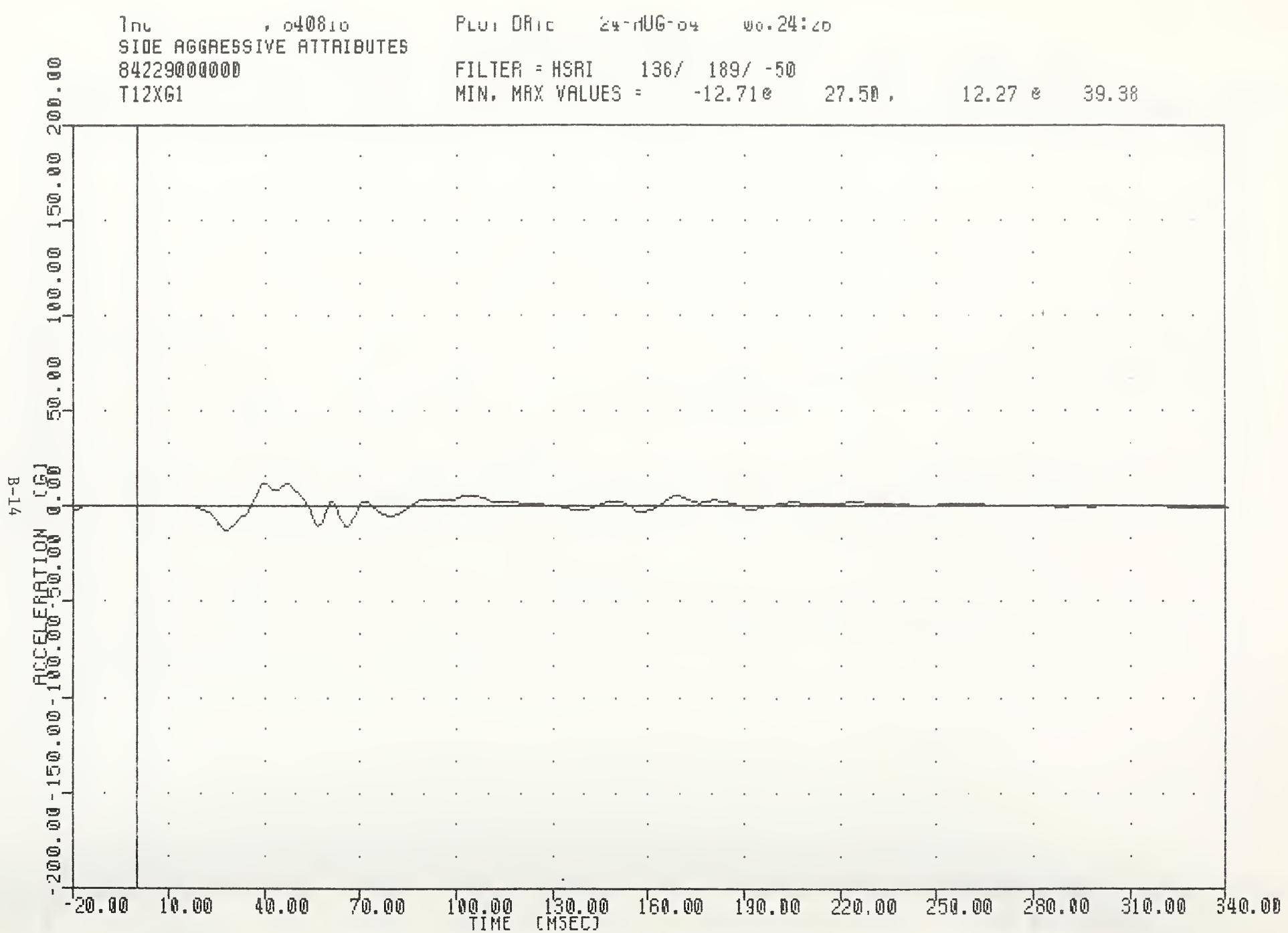


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T01YG1

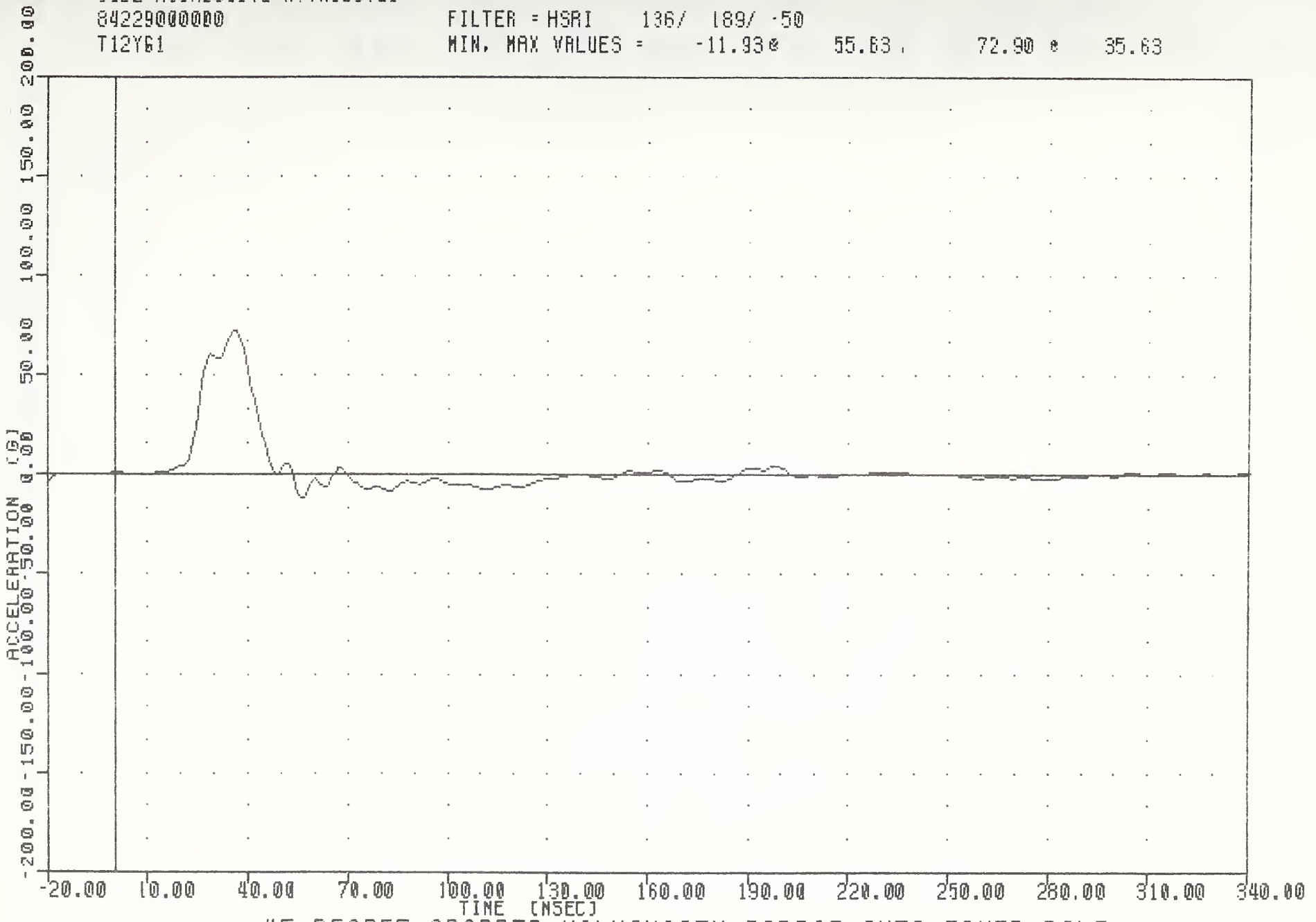
TRC , 840816 PLOT DATE 24-AUG-84 11:29:48
SIDE AGGRESSIVE ATTRIBUTES
8422900000D FILTER = HSRI 136/ 189/ -50
T01YVA MIN, MAX VALUES = -17.79@ 13.75 , 6.03 @ 63.75



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T01YGA

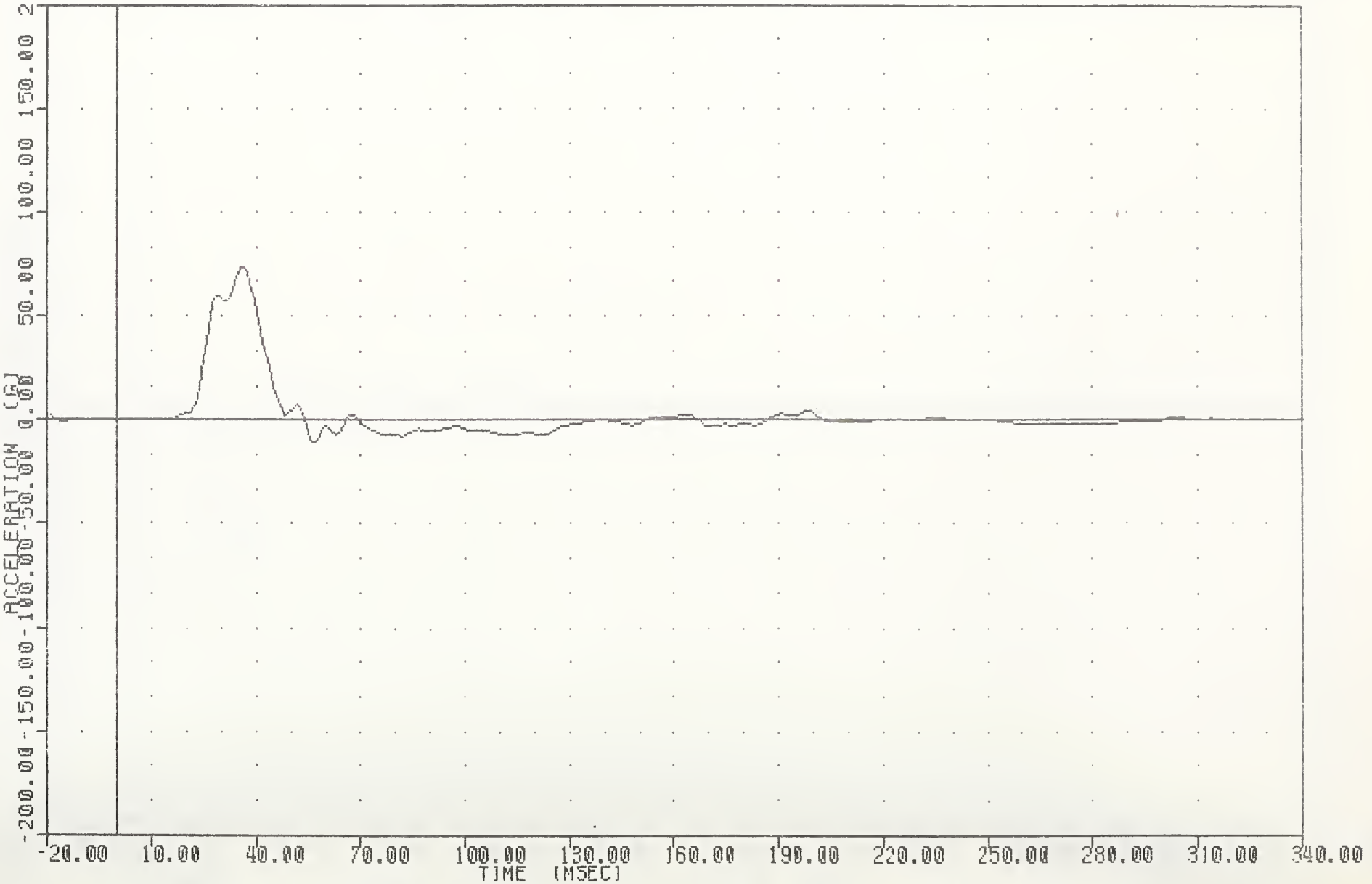


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE ACCELERATION X AXIS



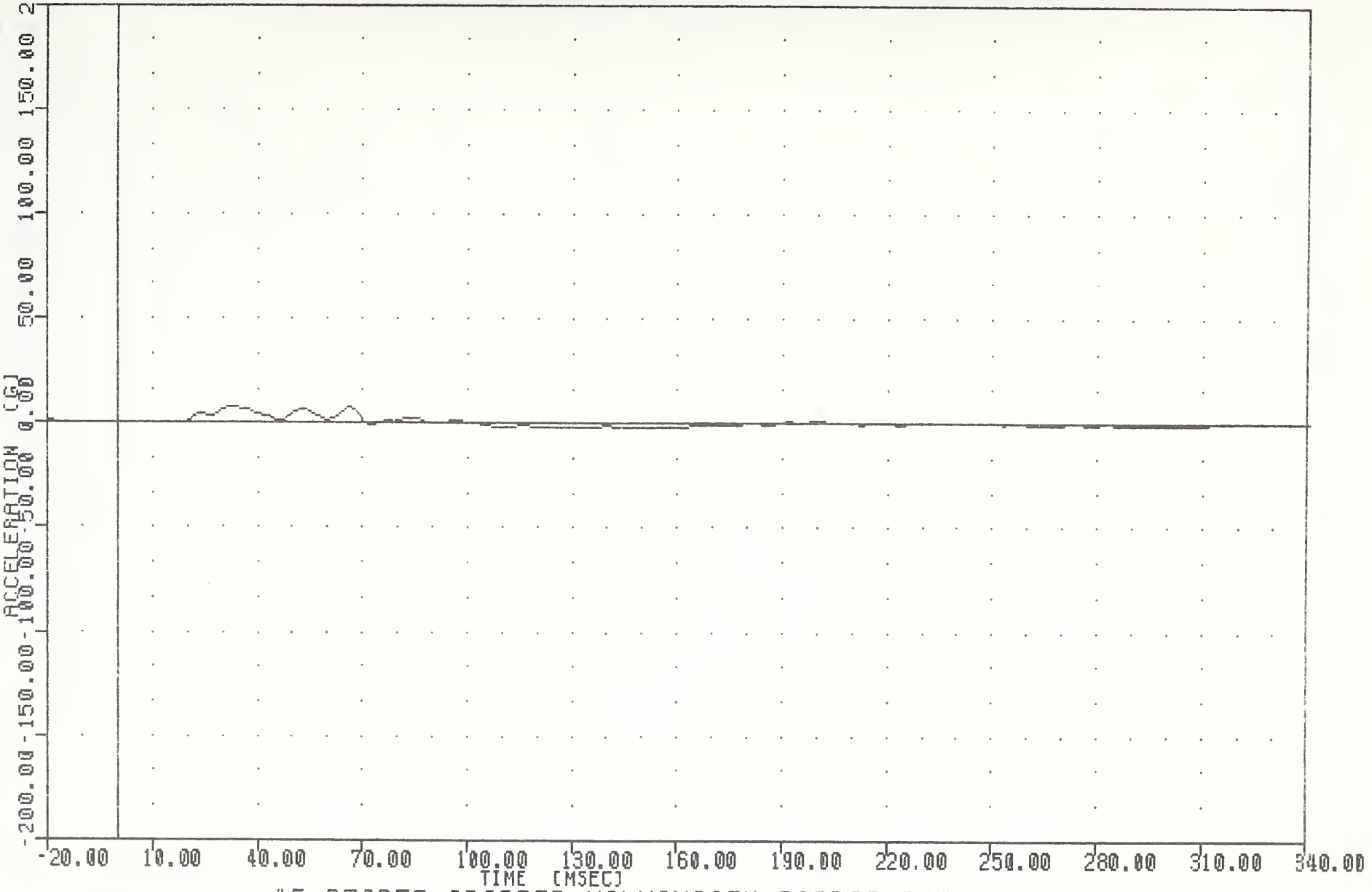
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE ACCELERATION Y AXIS

INC , 040810 PLOT DATE 24-AUG-04 00:24:20
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12YGA MIN, MAX VALUES = -10.54 @ 55.63 , 73.34 @ 35.63



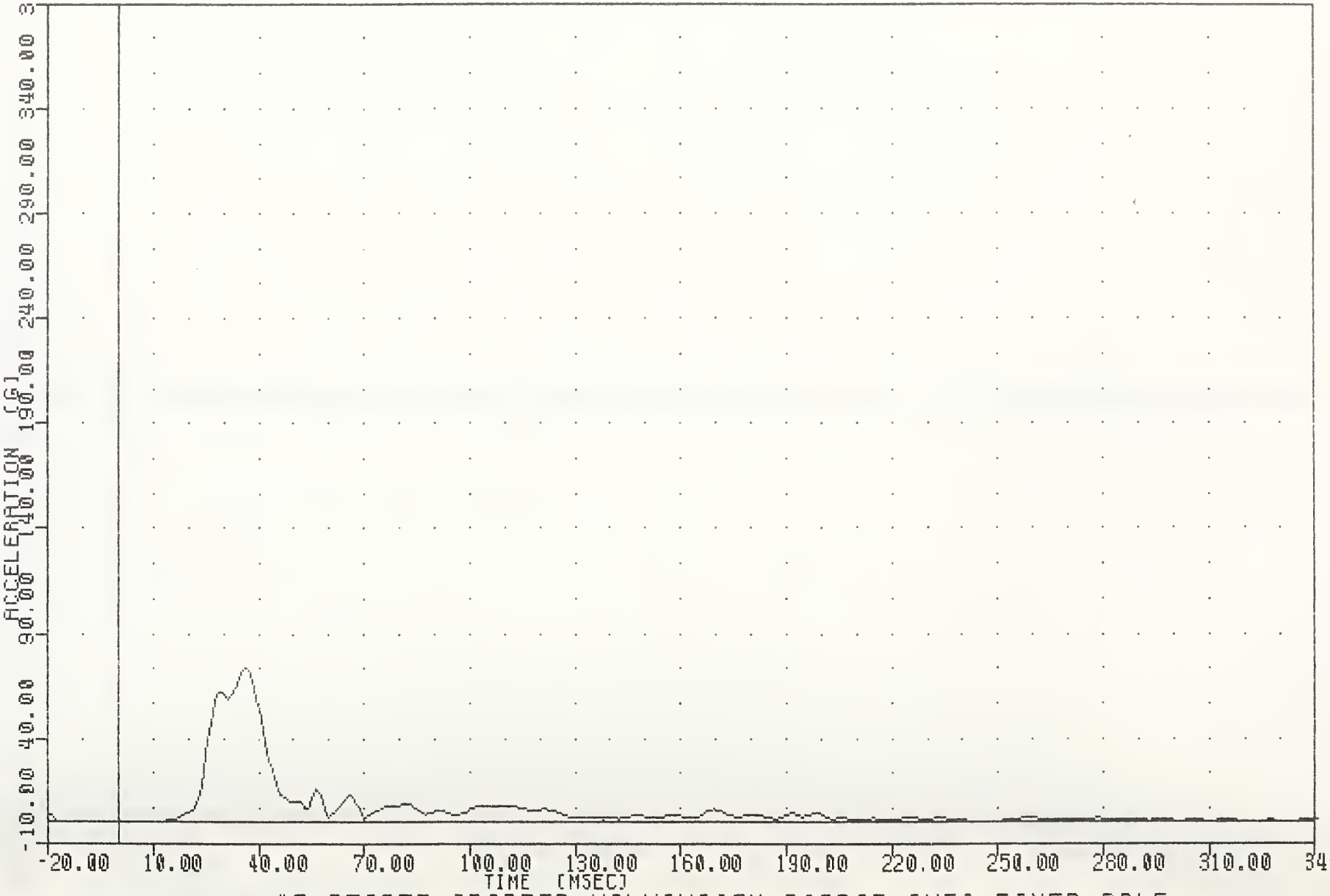
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE ACCELERATION -2 Y AXIS

TNC , 040810 PLOT DATE 24-AUG-84 00:24:20
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12ZG1 MIN, MAX VALUES = -2.26 @ 133.75 , 7.63 @ 31.88



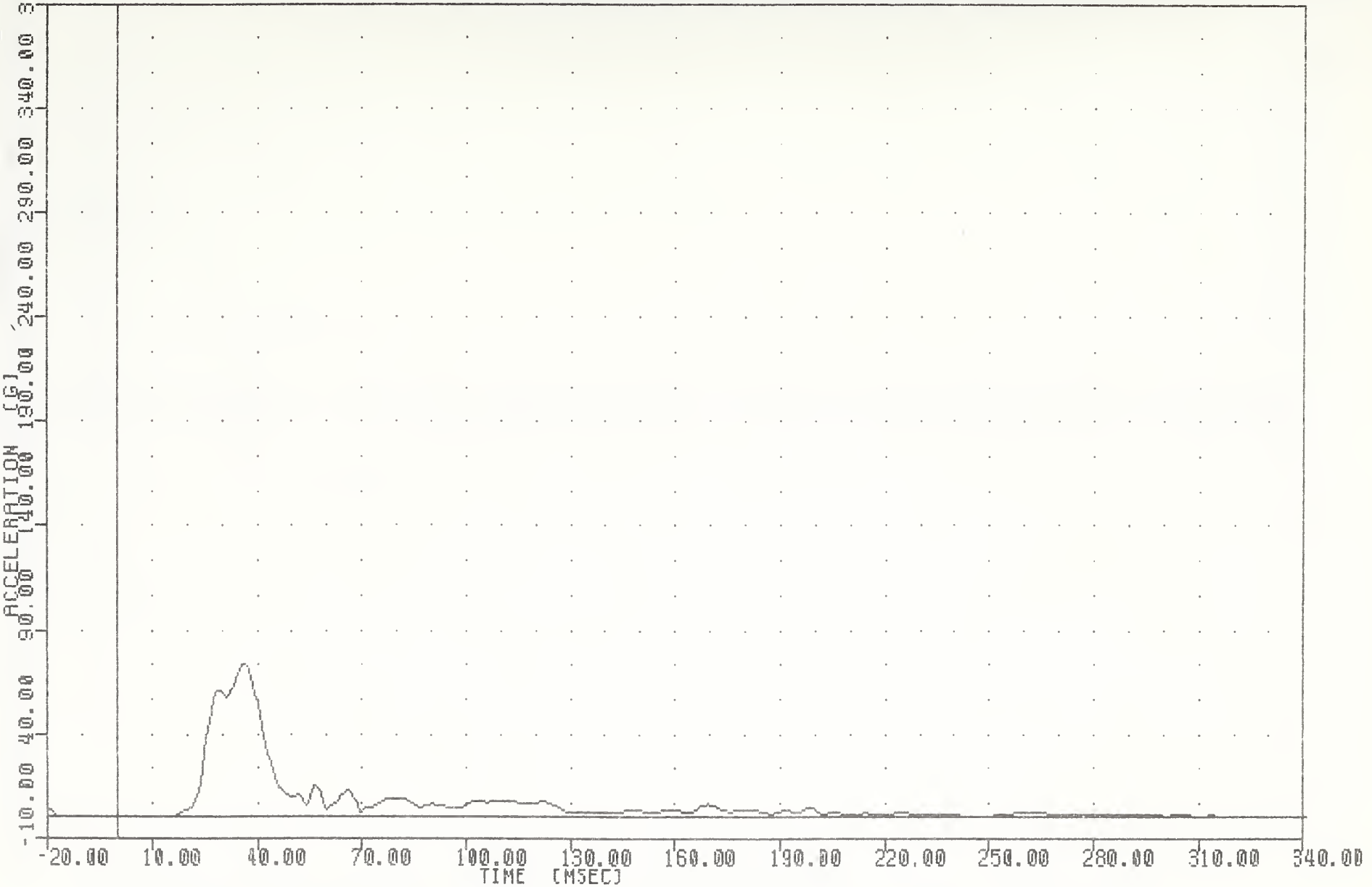
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE ACCELERATION Z AXIS

Inc , 040810 PLOT DATE 24 AUG-04 08:24:20
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12RG1 MIN, MAX VALUES = 0.14@ -6.25 , 73.24 @ 35.63

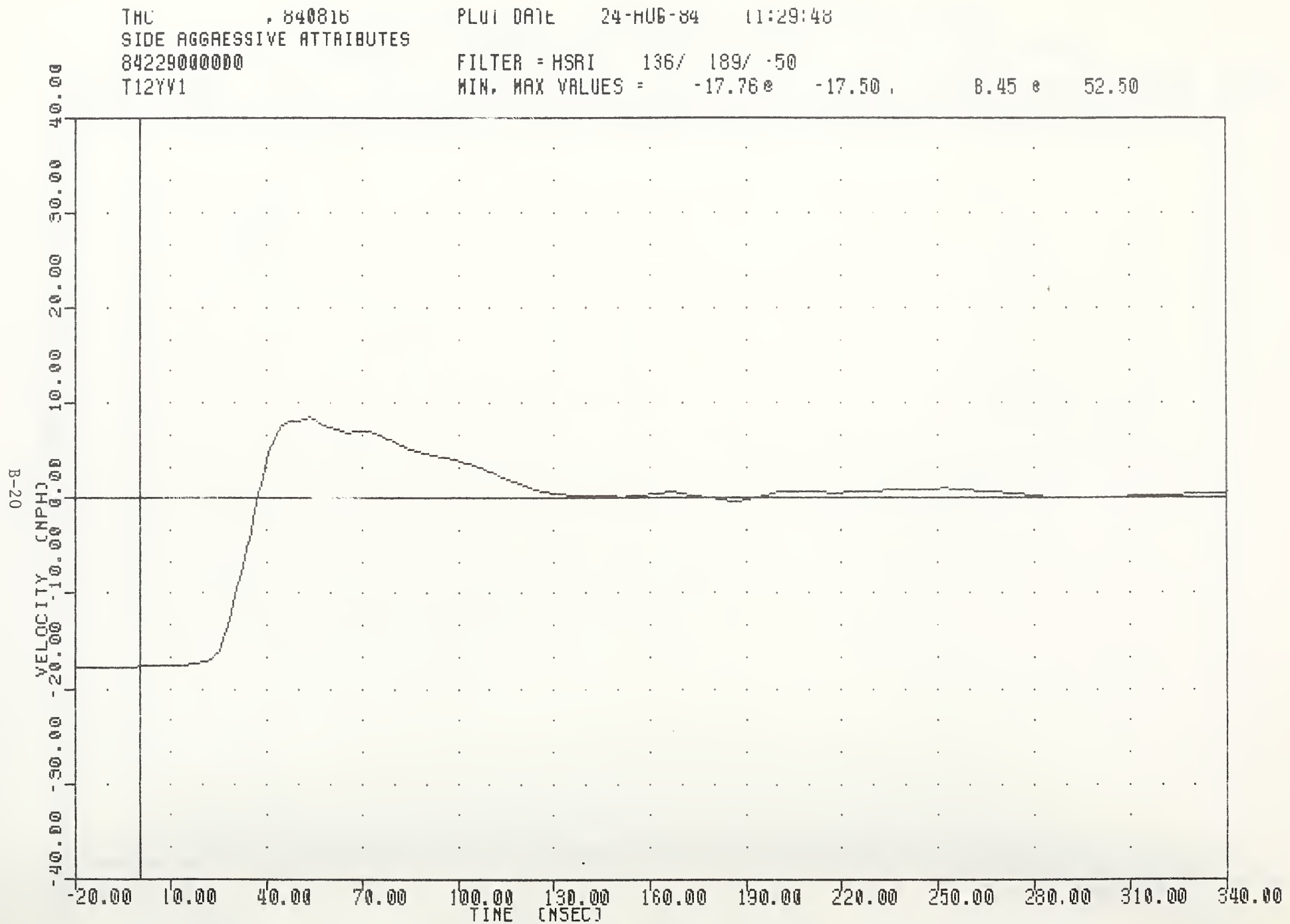


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE RESULTANT

TRC , 840816 PLOT DATE 24-AUG-84 08:25:38
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = NSRI 136/ 189/ -50
T12RGA MIN, MAX VALUES = 0.18@ -5.00 , 73.67 @ 35.63

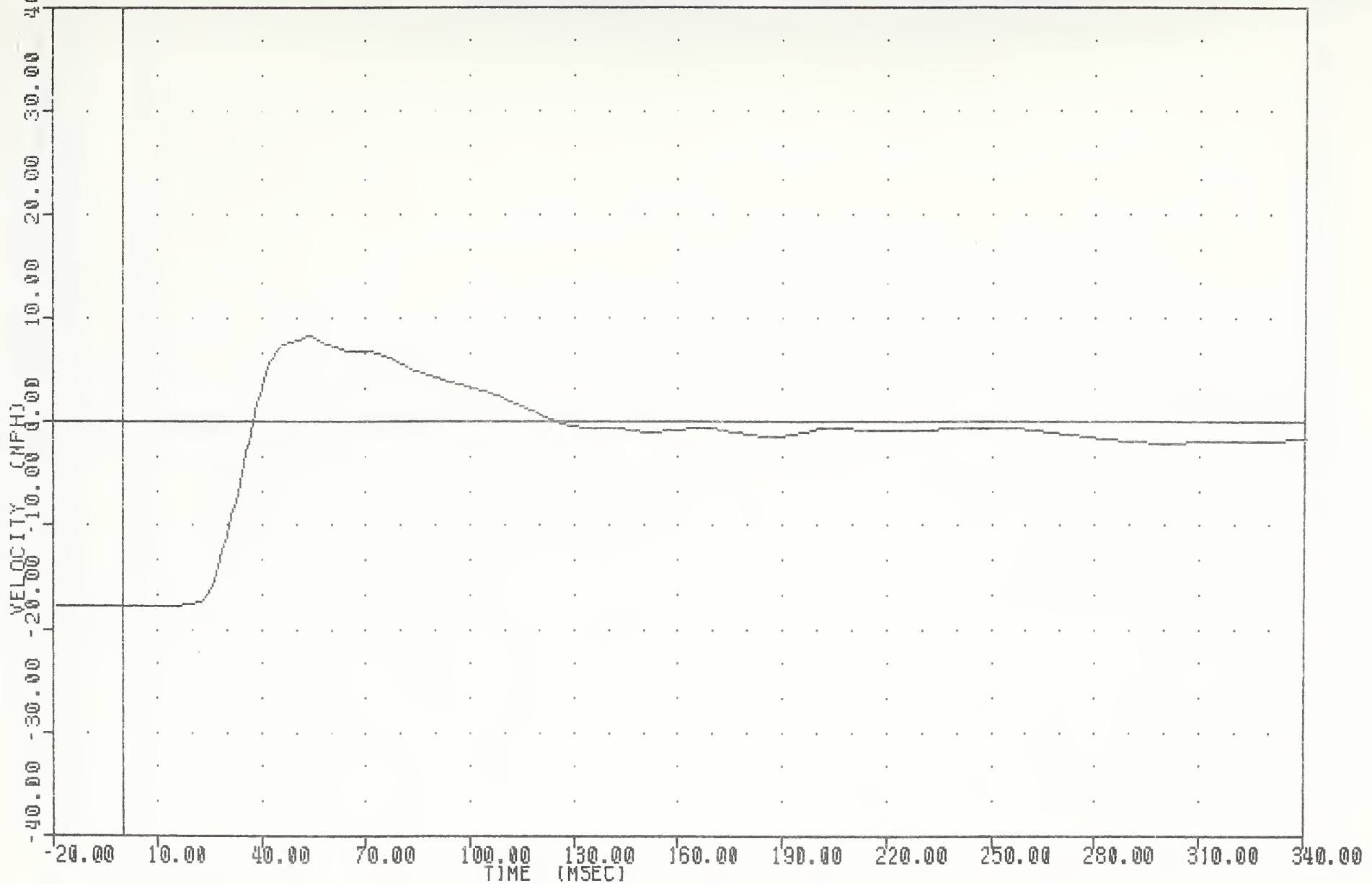


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LOWER SPINE RESULTANT USING T12YGA

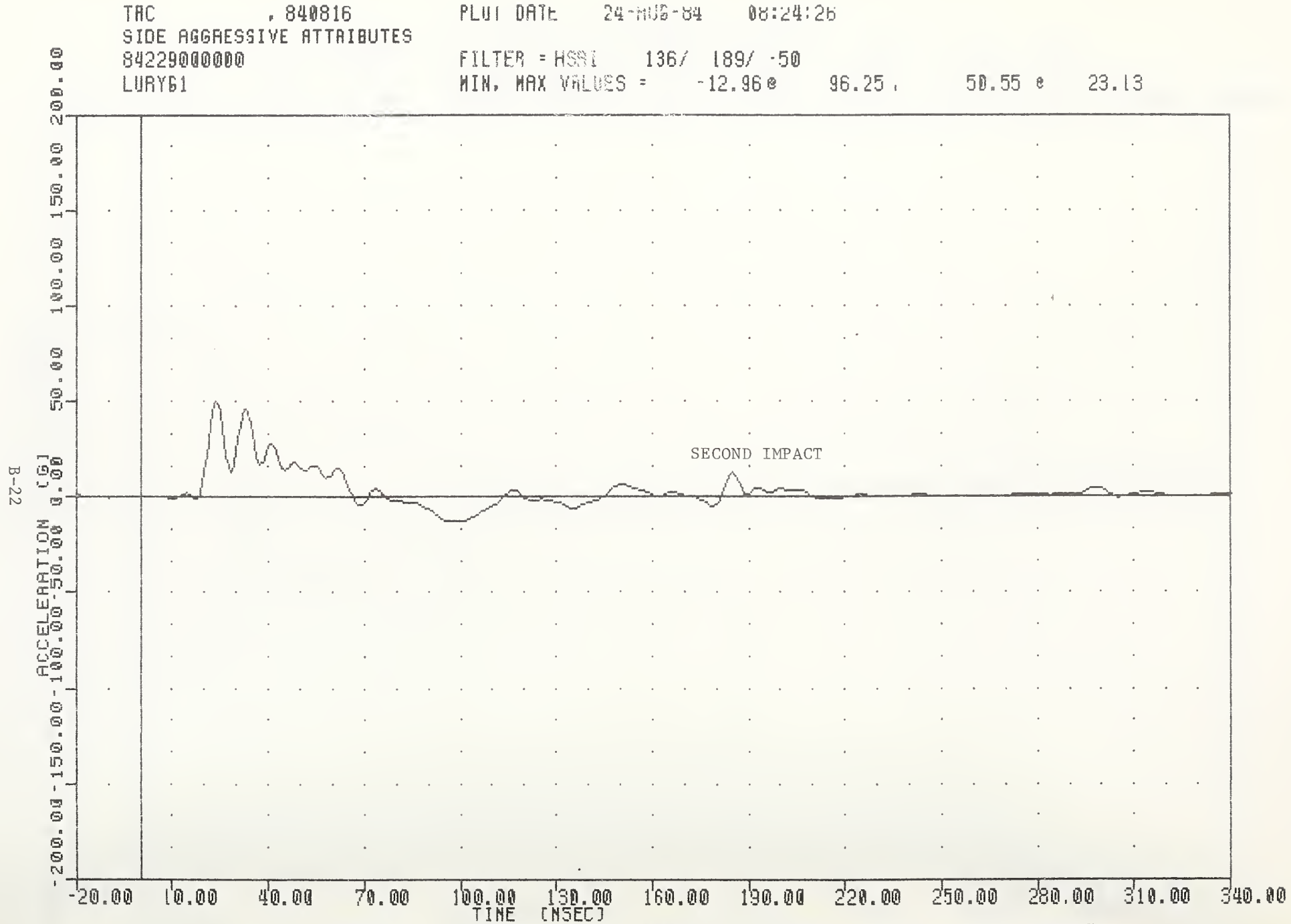


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T12YG1

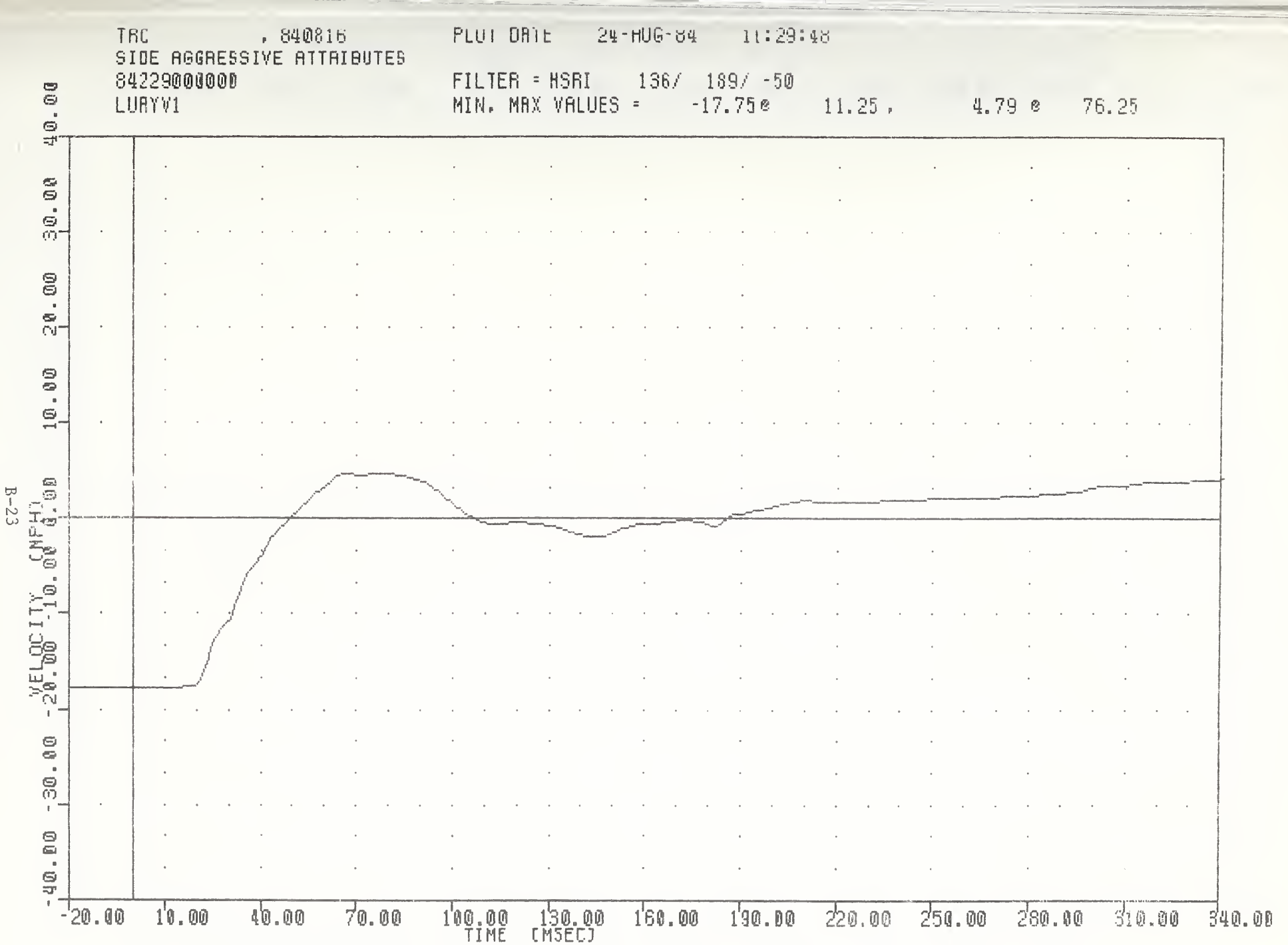
TRC , 840816 PLOT DATE 24-AUG-84 11:29:48
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12YVA MIN, MAX VALUES = -17.73 @ 6.88 , 8.25 @ 53.12



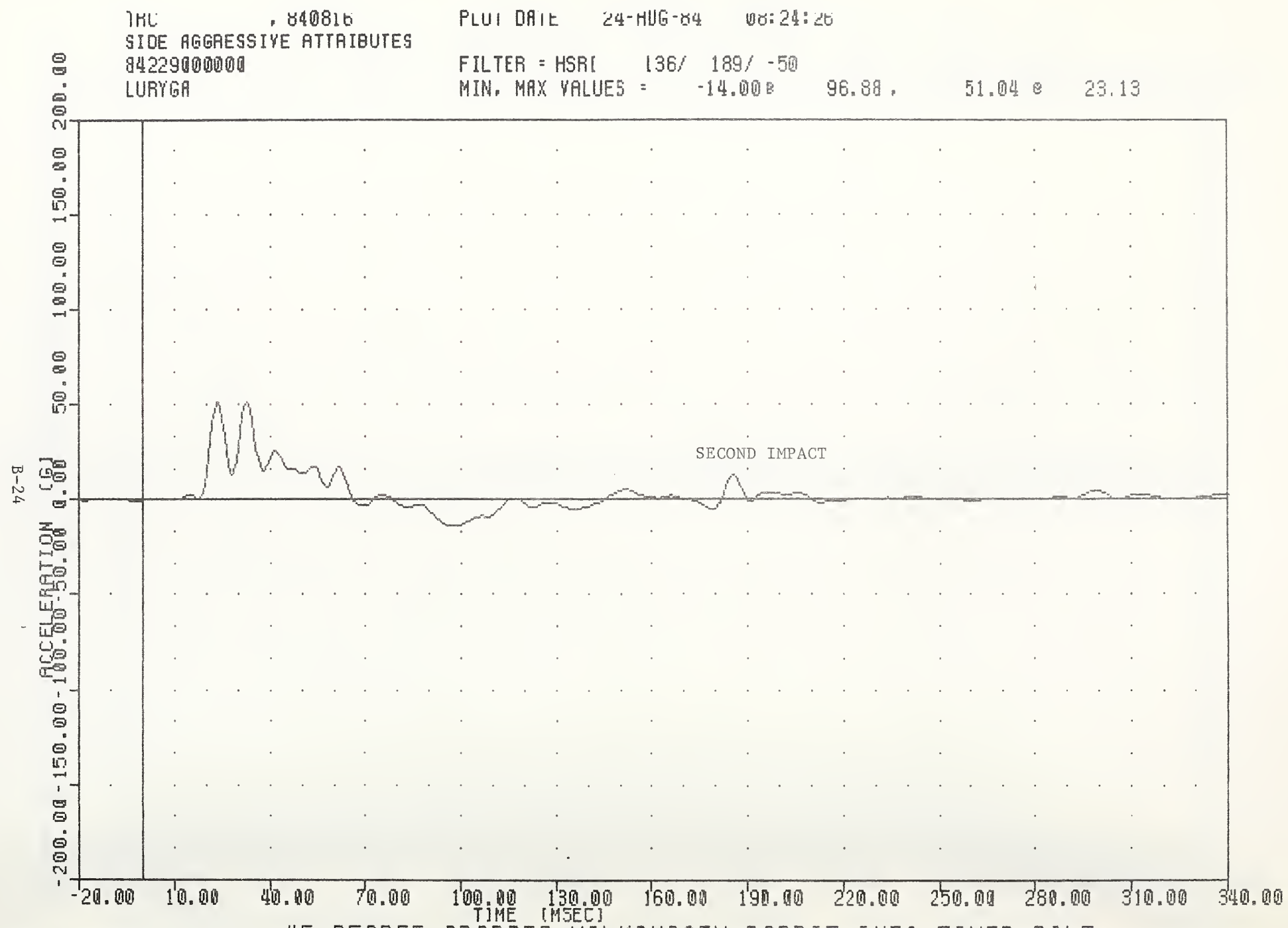
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T12YGA



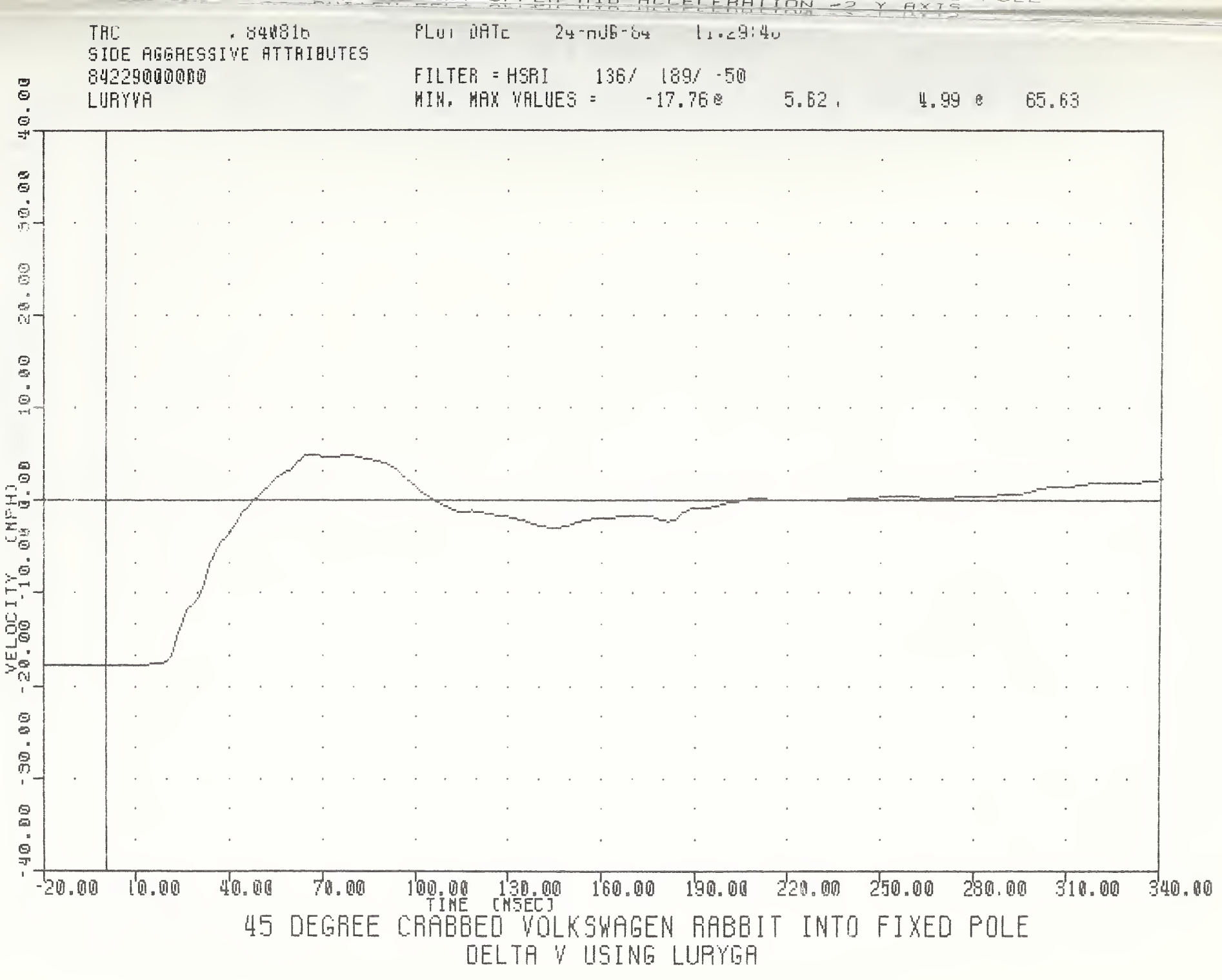
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS



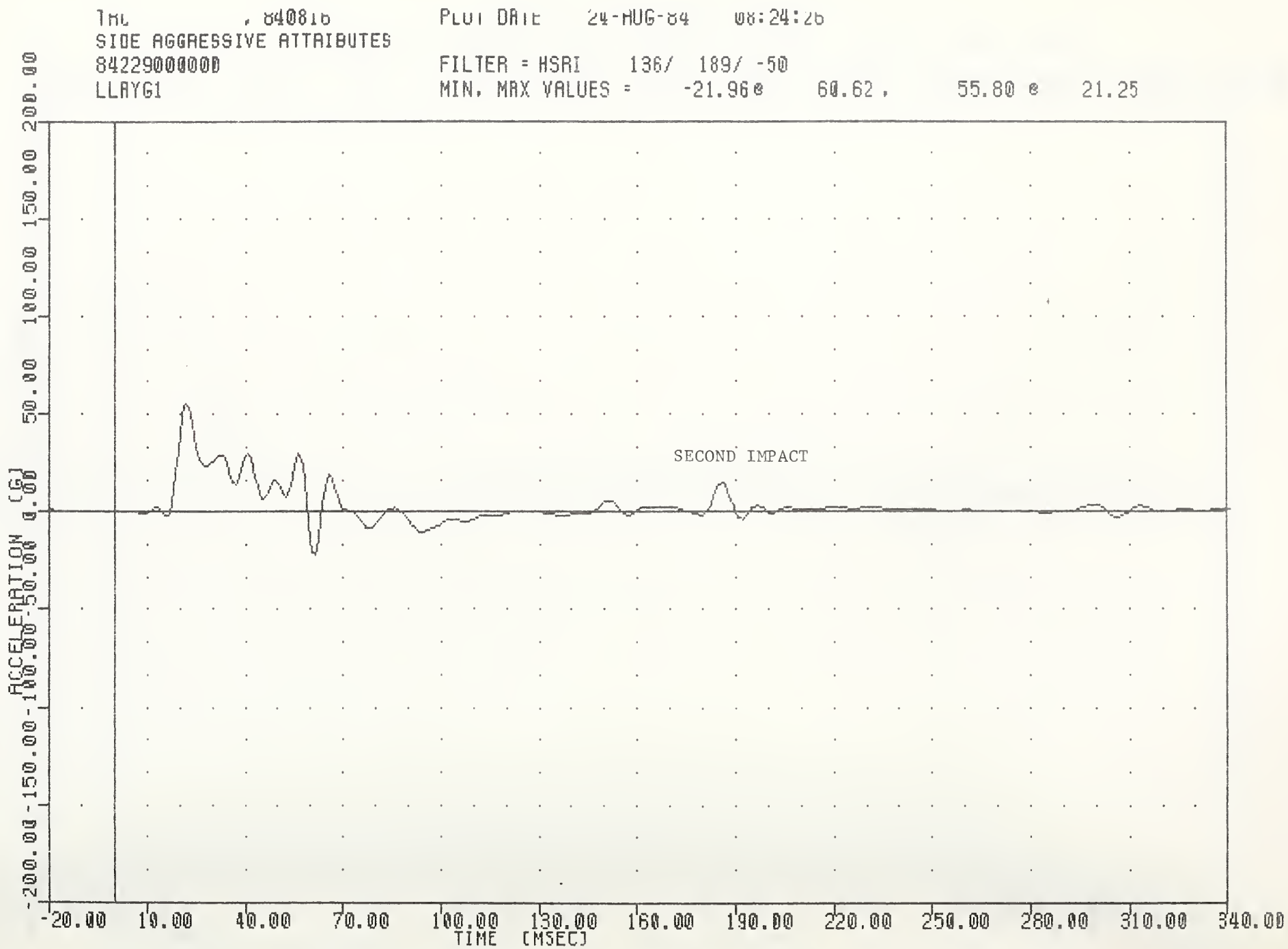
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LURYG1



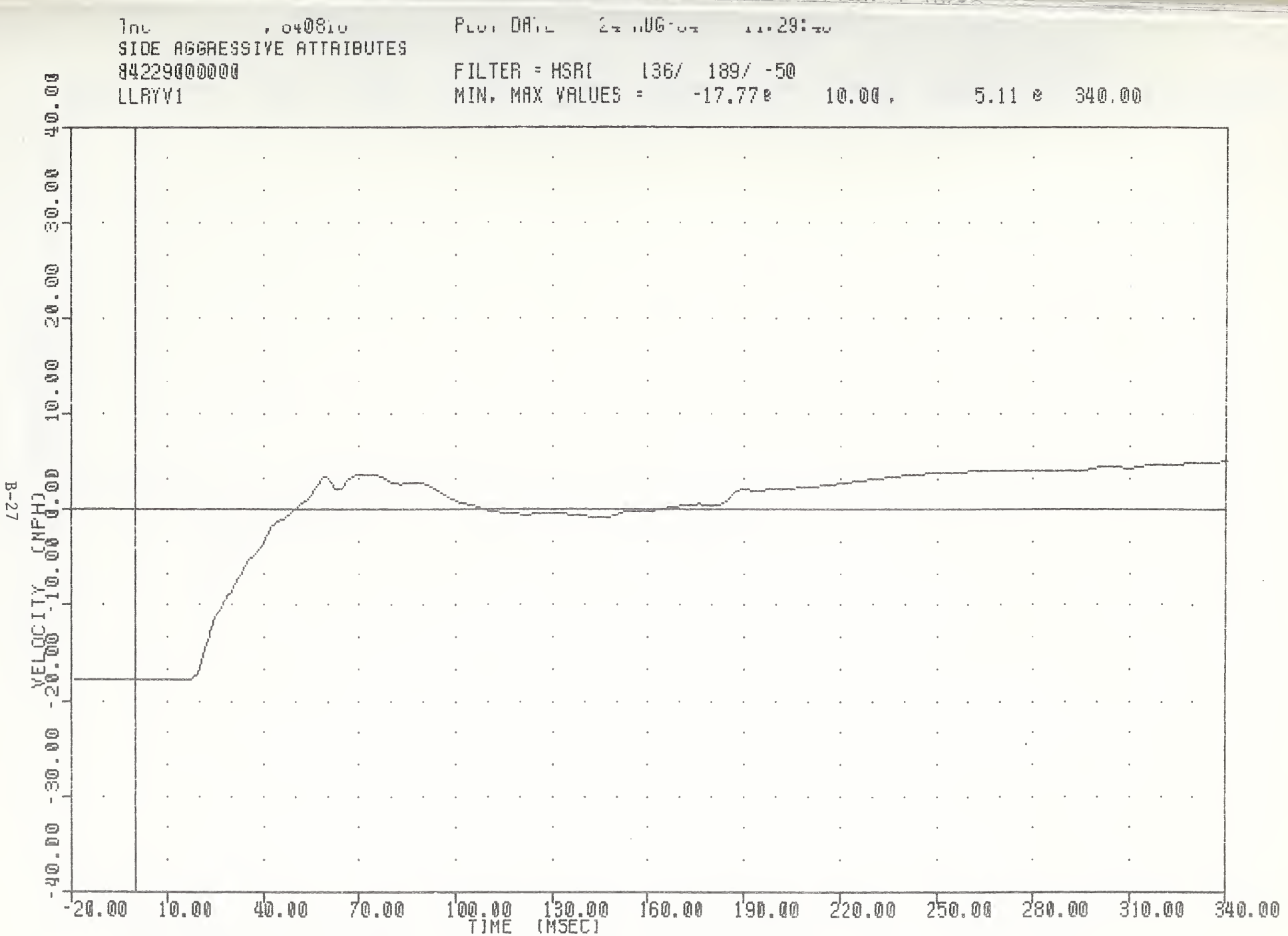
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LEFT UPPER RIB ACCELERATION #2 Y AXIS



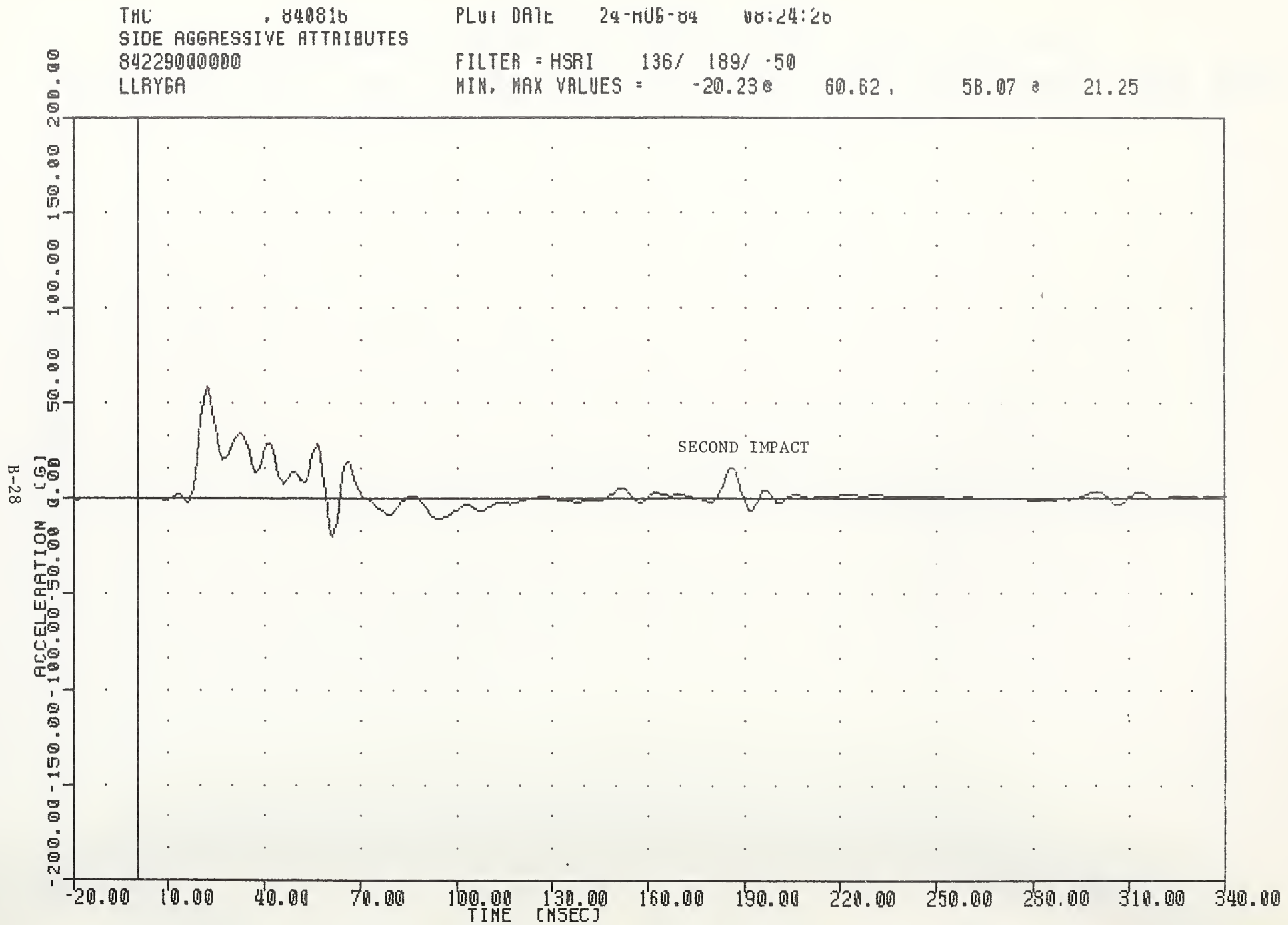
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LURYGA



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

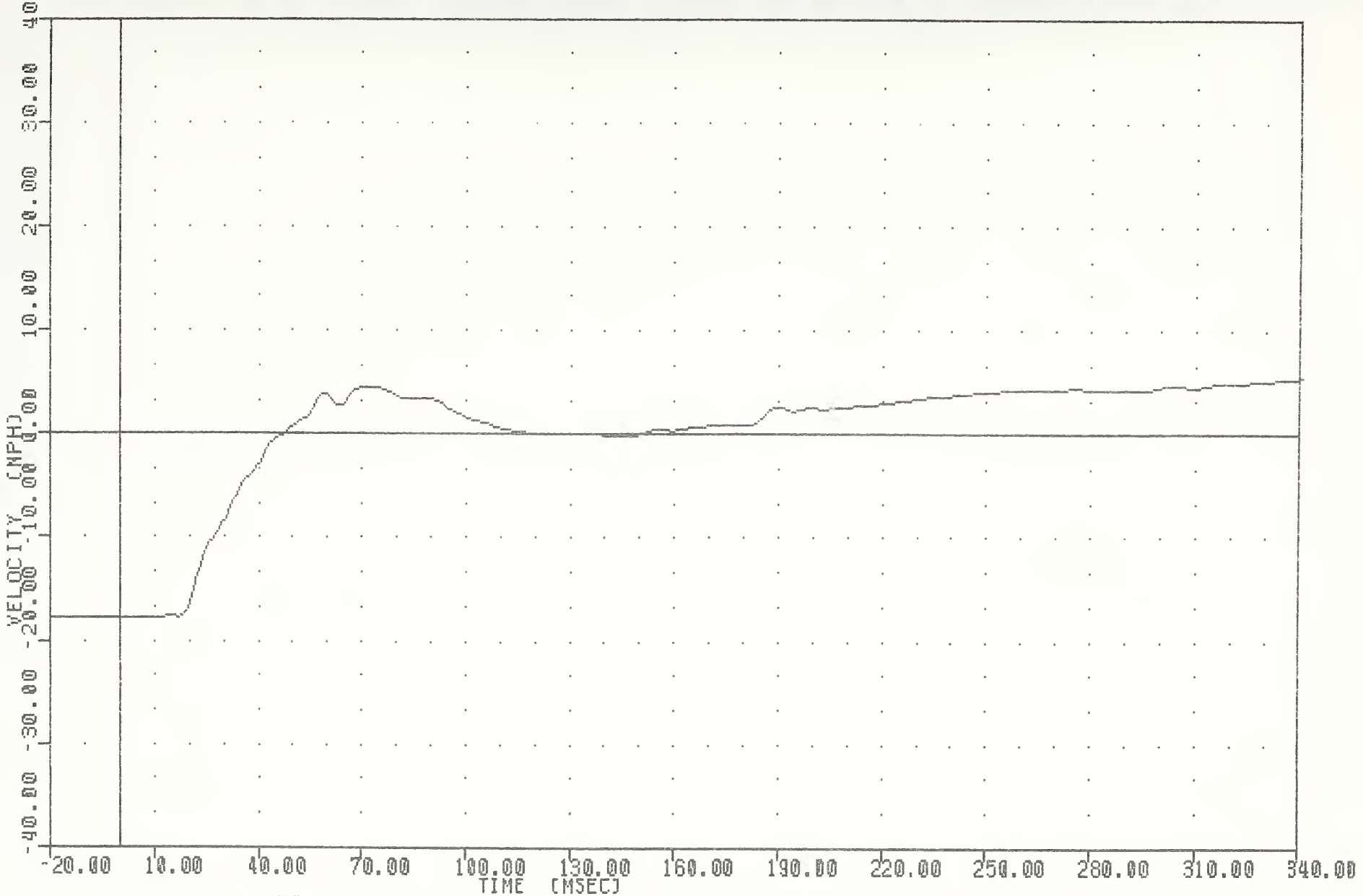


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LLRYG1

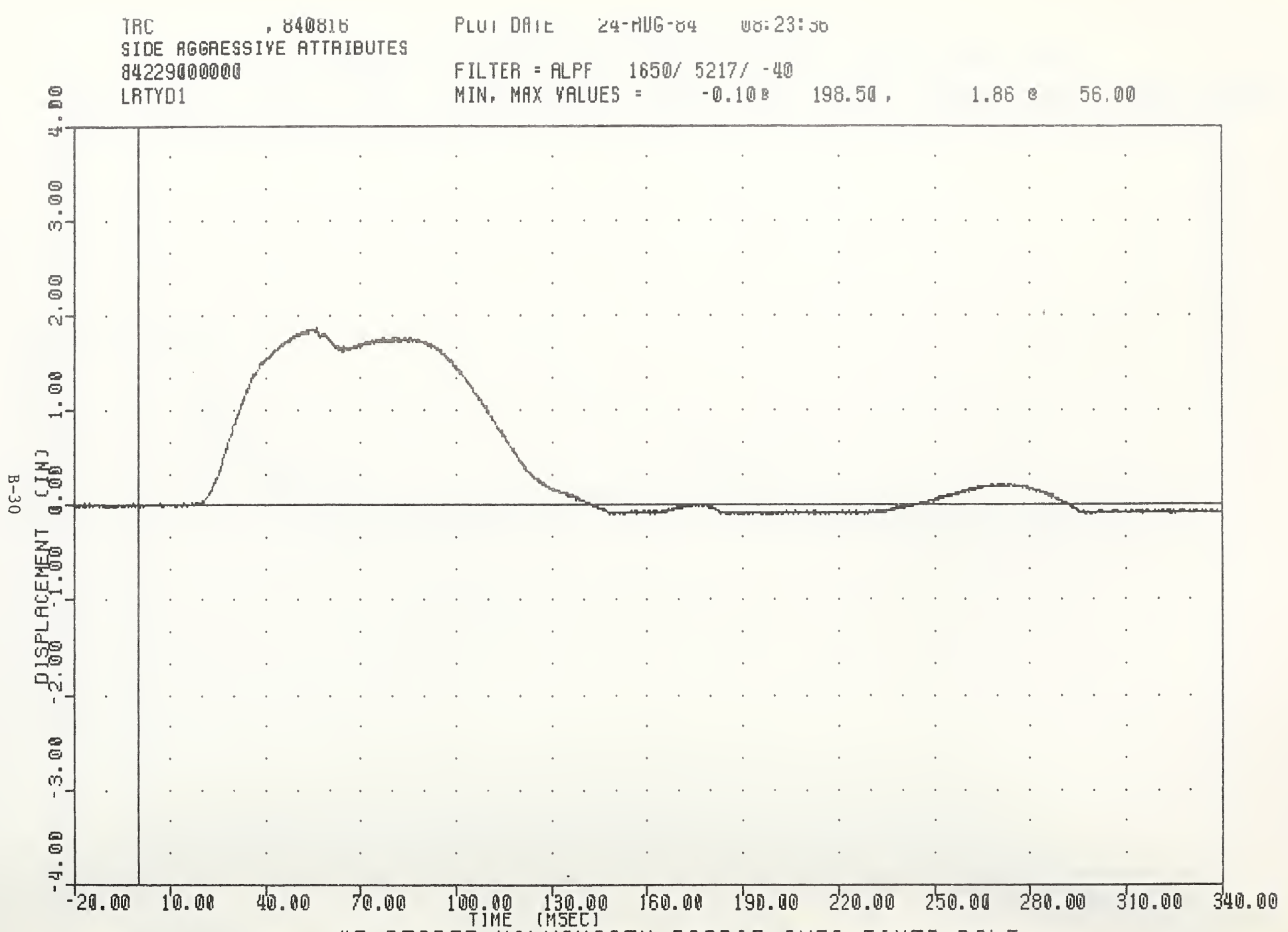


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS

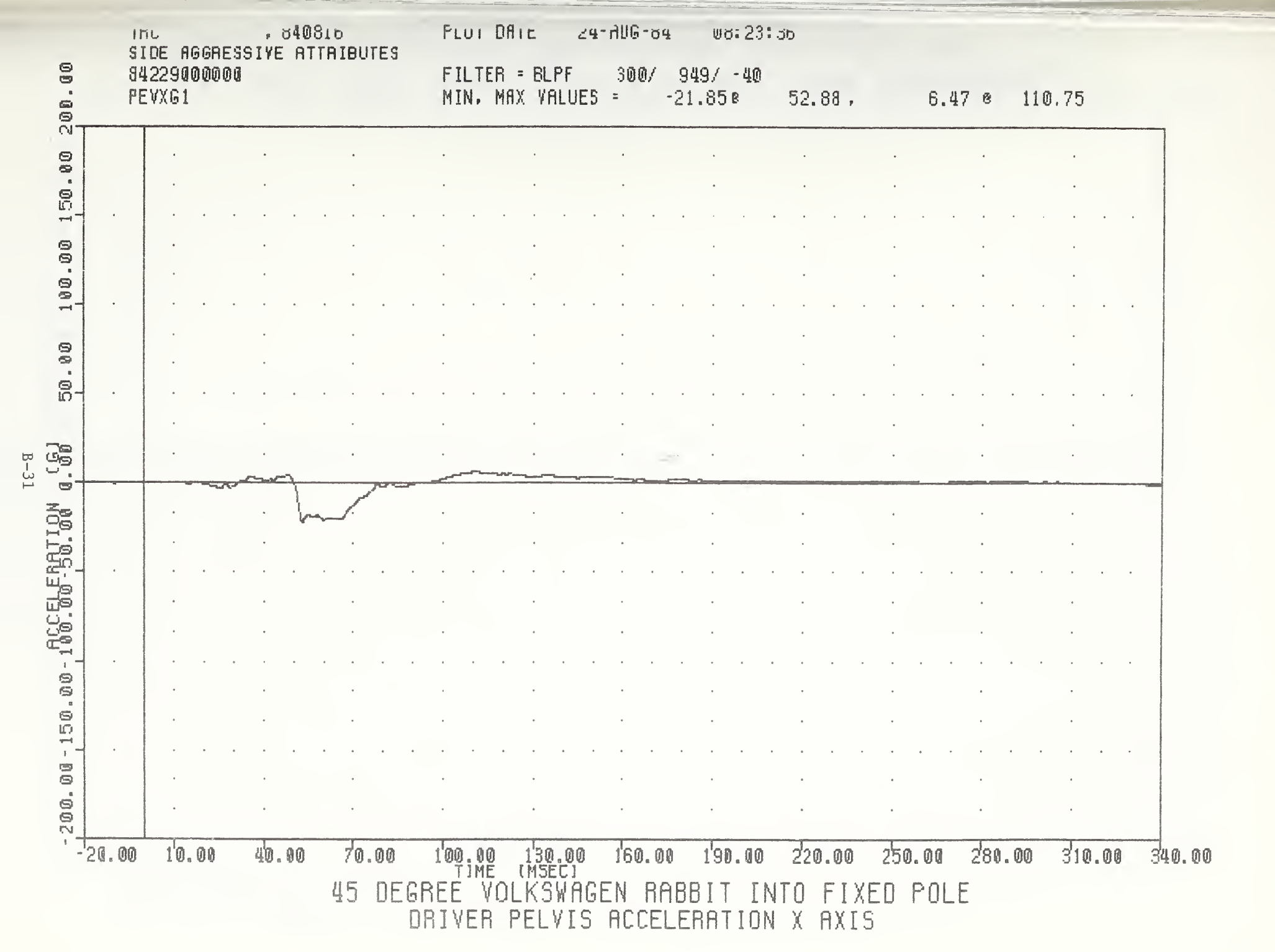
TAC , 040810 PLOT DATE 24 AUG-04 11:29:40
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
LLRYVA MIN. MAX VALUES = -17.73@ 10.00 , 5.47 @ 340.00



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LLRYGA

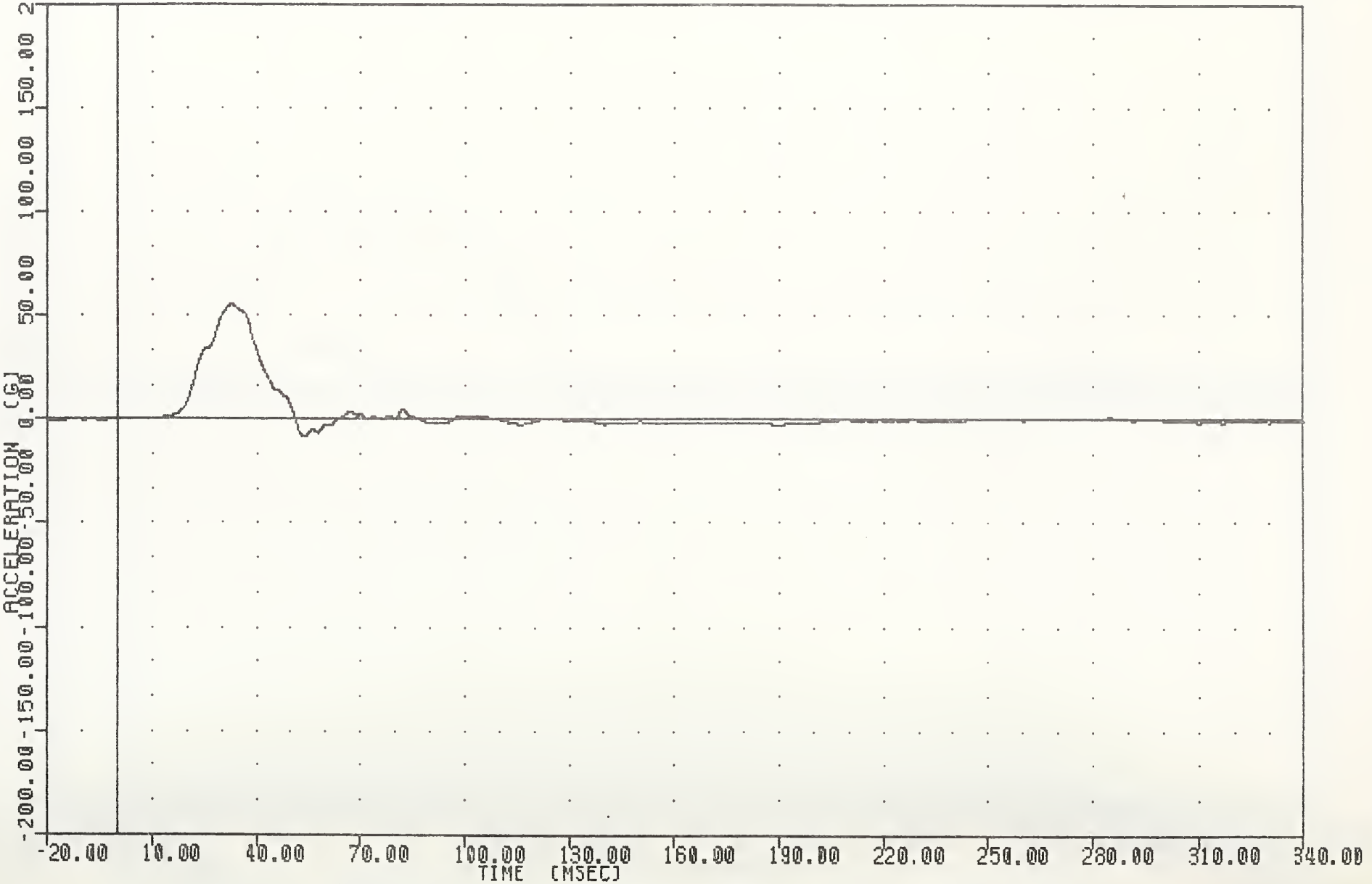


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER LEFT RIB TO SPINE DISPLACEMENT INCHES

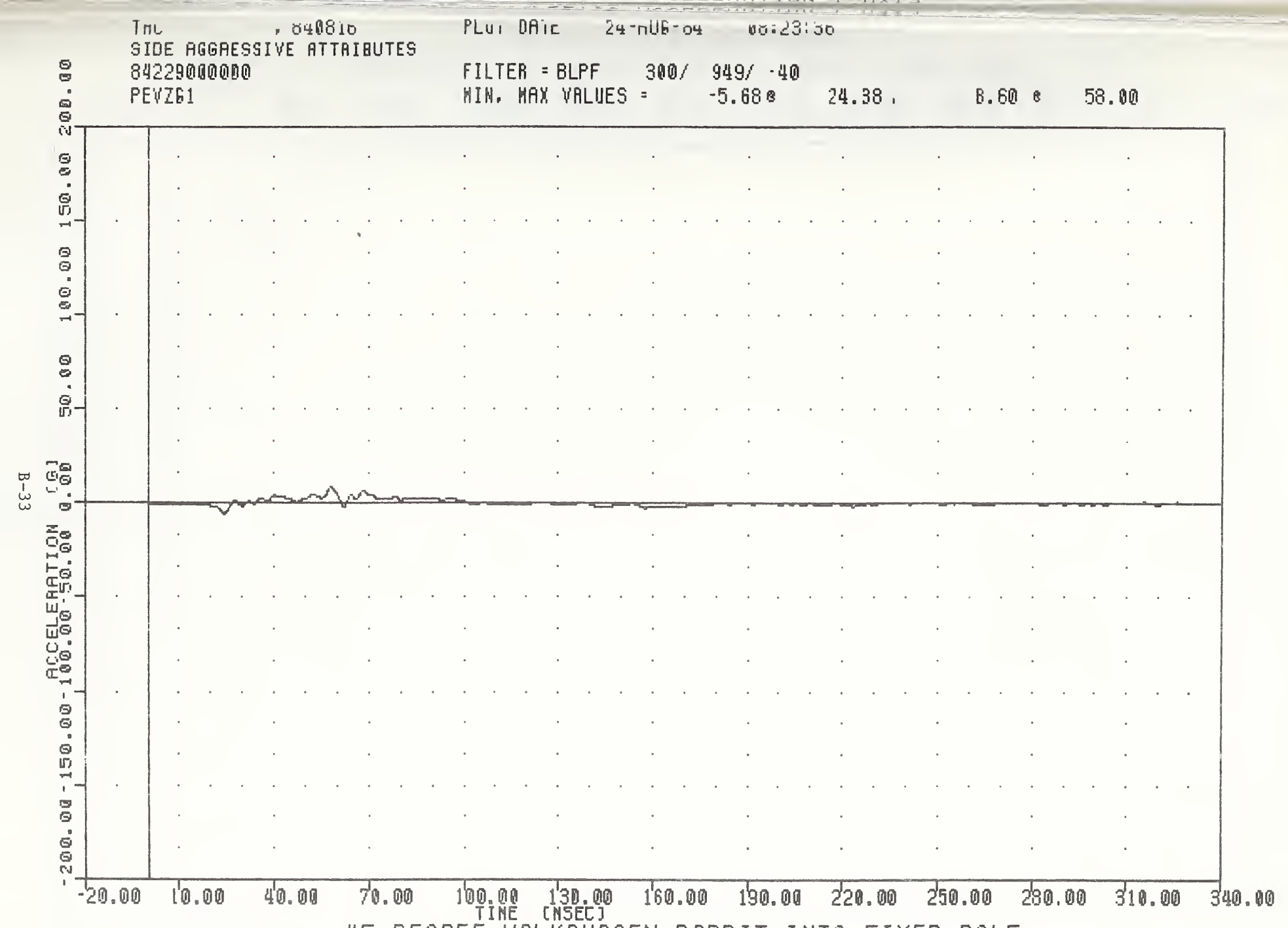


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER PELVIS ACCELERATION X AXIS

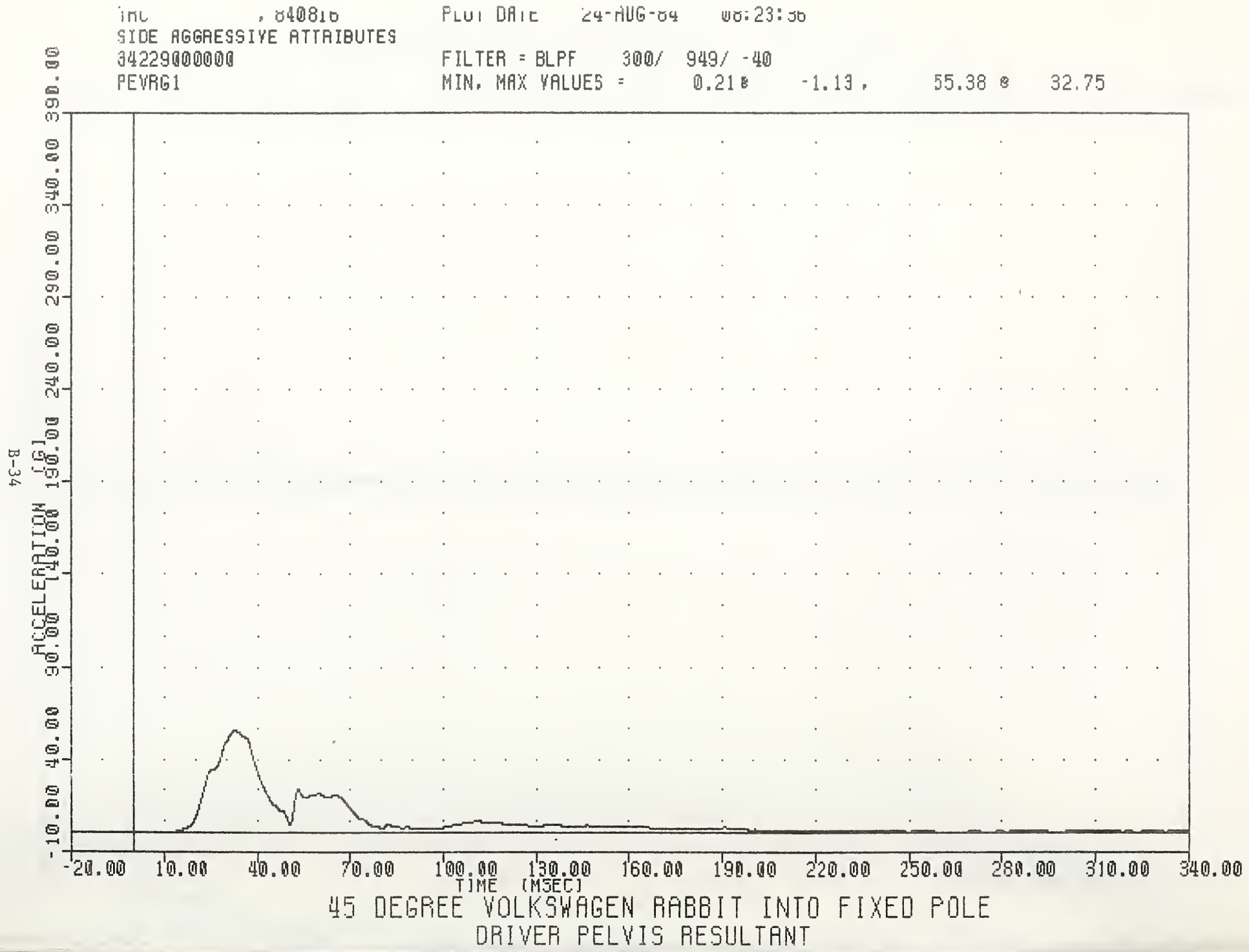
TRC , 840816 PLOT DATE 24-AUG-84 08:23:36
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 300/ 949/ -40
PEVYG1 MIN, MAX VALUES = -8.71@ 53.50 , 55.37 @ 32.75



45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER PELVIS ACCELERATION Y AXIS

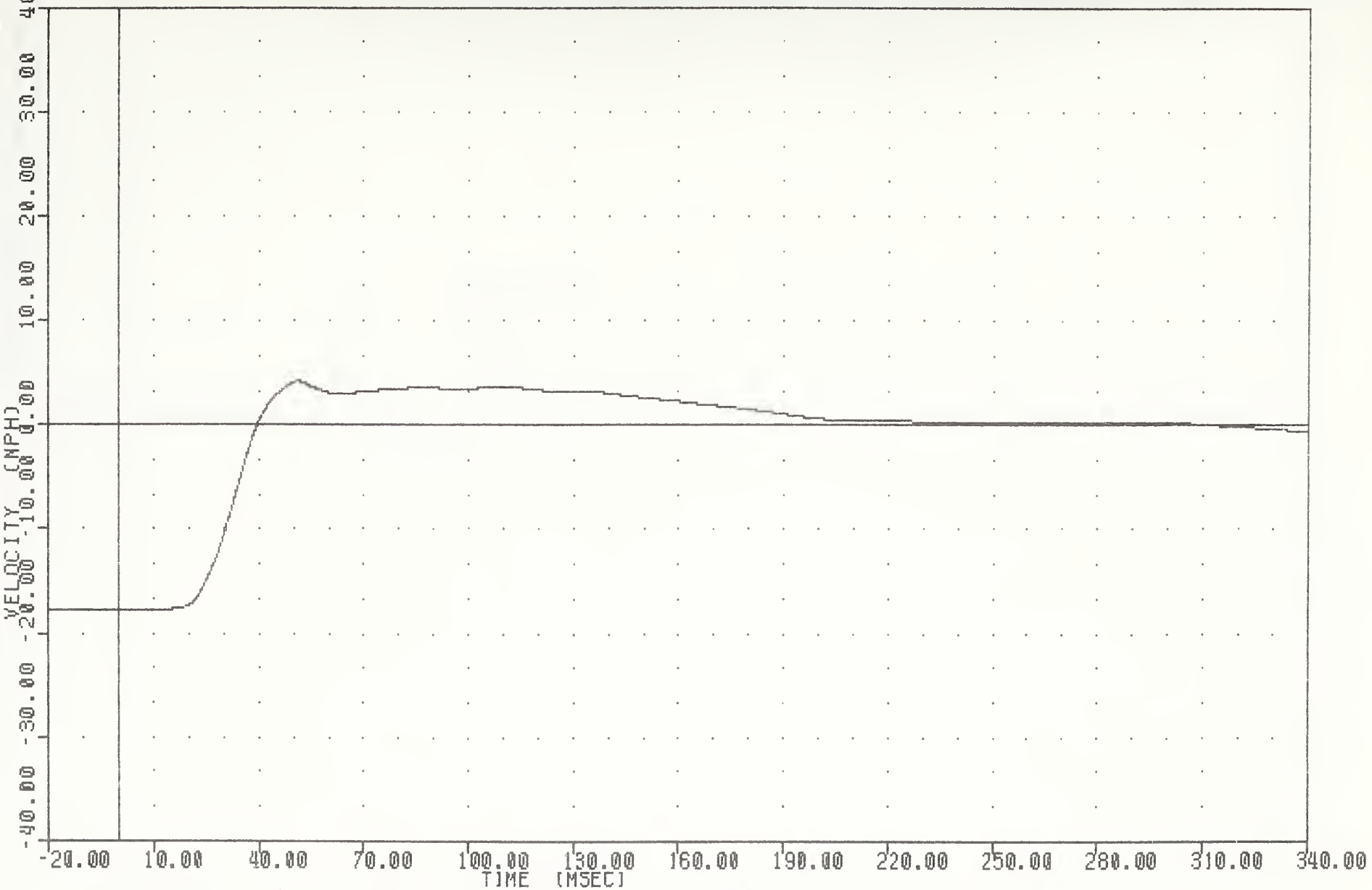


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER PELVIS ACCELERATION Z AXIS

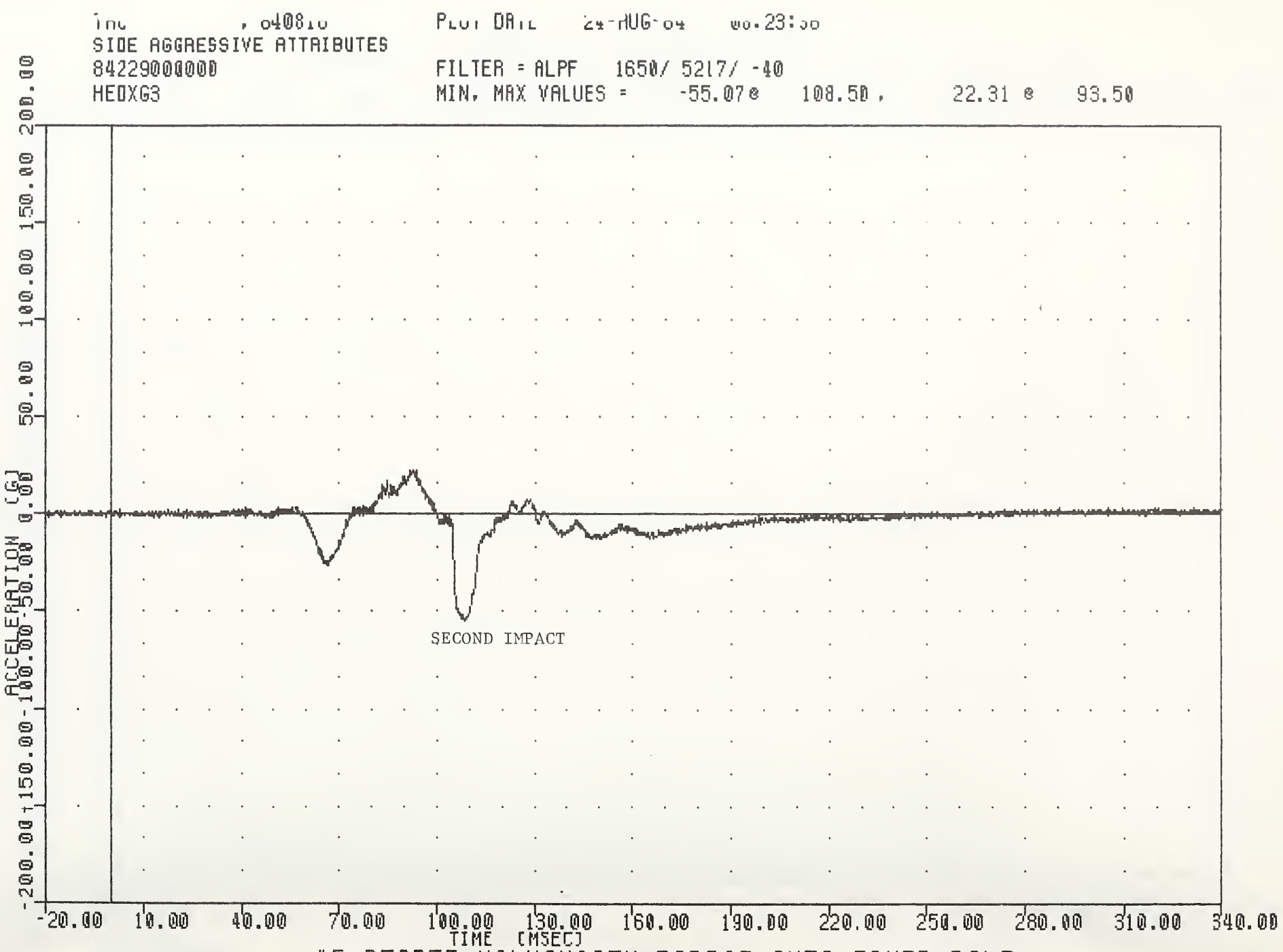

INC , 840816
PLOT DATE 24-AUG-84 08:23:36
SIDE AGGRESSIVE ATTRIBUTES
342290000000
PEVRG1
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = 0.21 @ -1.13 , 55.38 @ 32.75
ACCELERATION [G]
-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)
45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
DRIVER PELVIS RESULTANT

SIDE AGGRESSIVE ATTRIBUTES
84229000000
PEVYV1

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -17.81 @ -1.13 , 4.22 @ 51.13

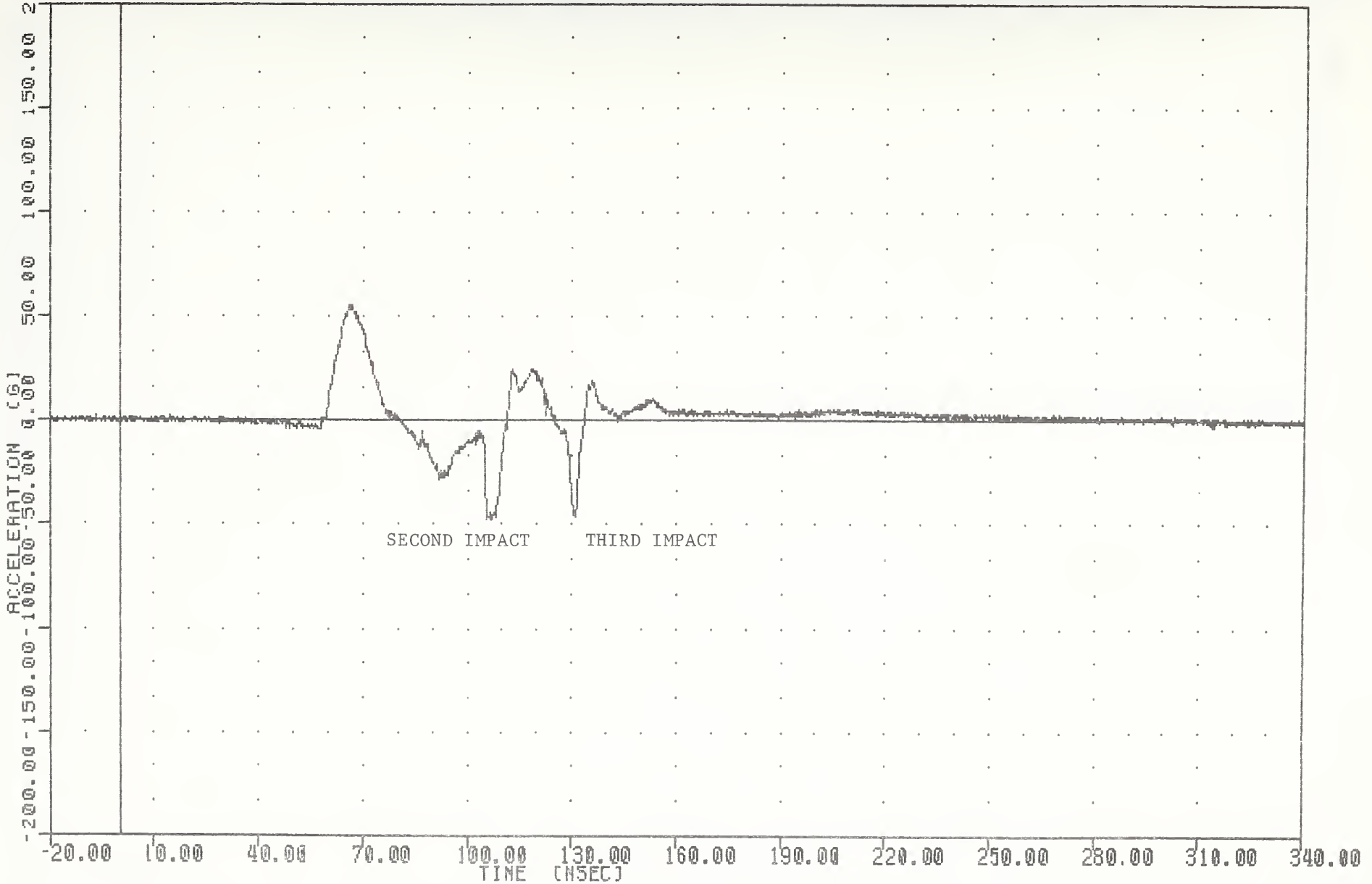


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING PEVYG1

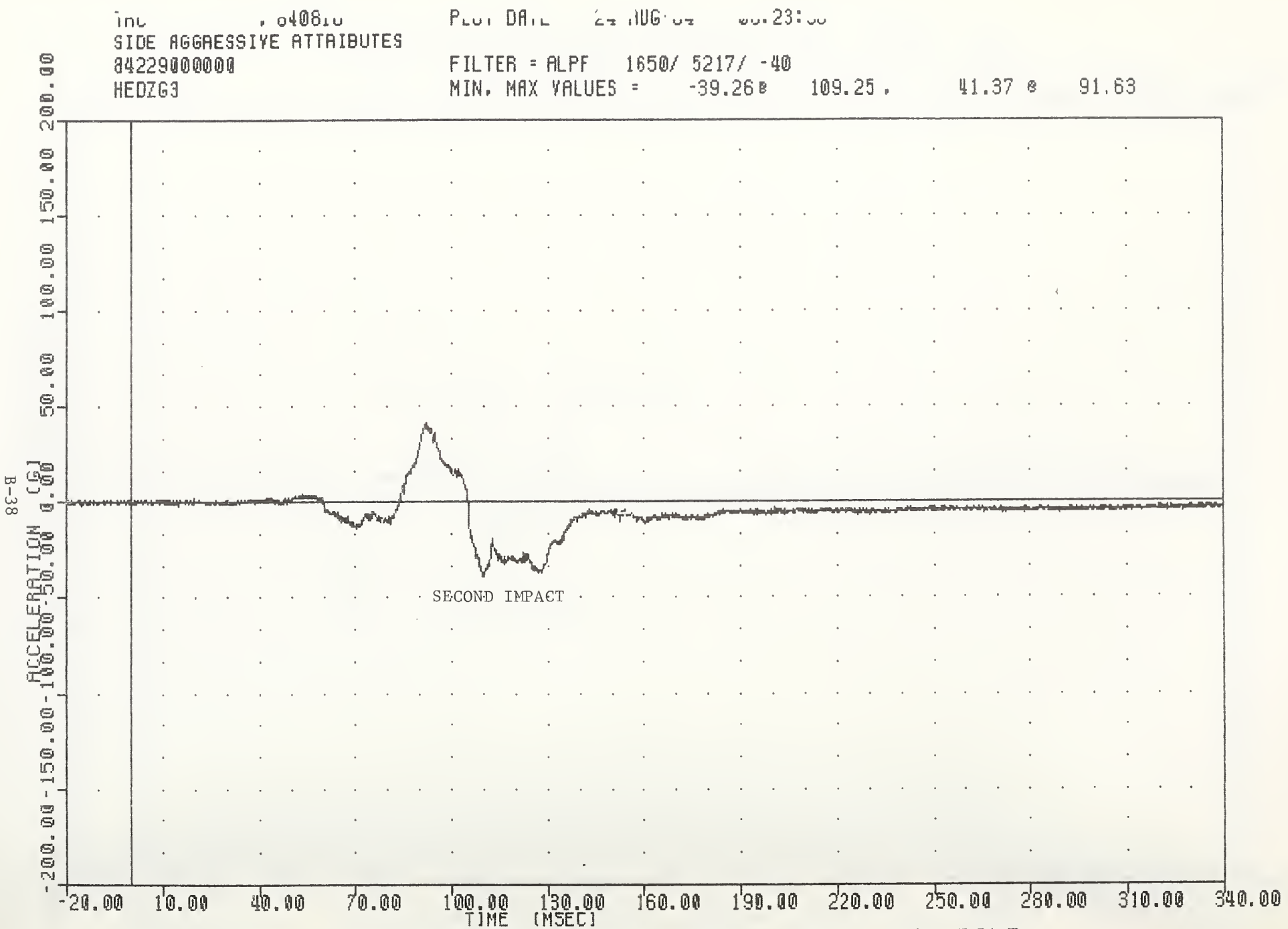


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER HEAD ACCELERATION X AXIS

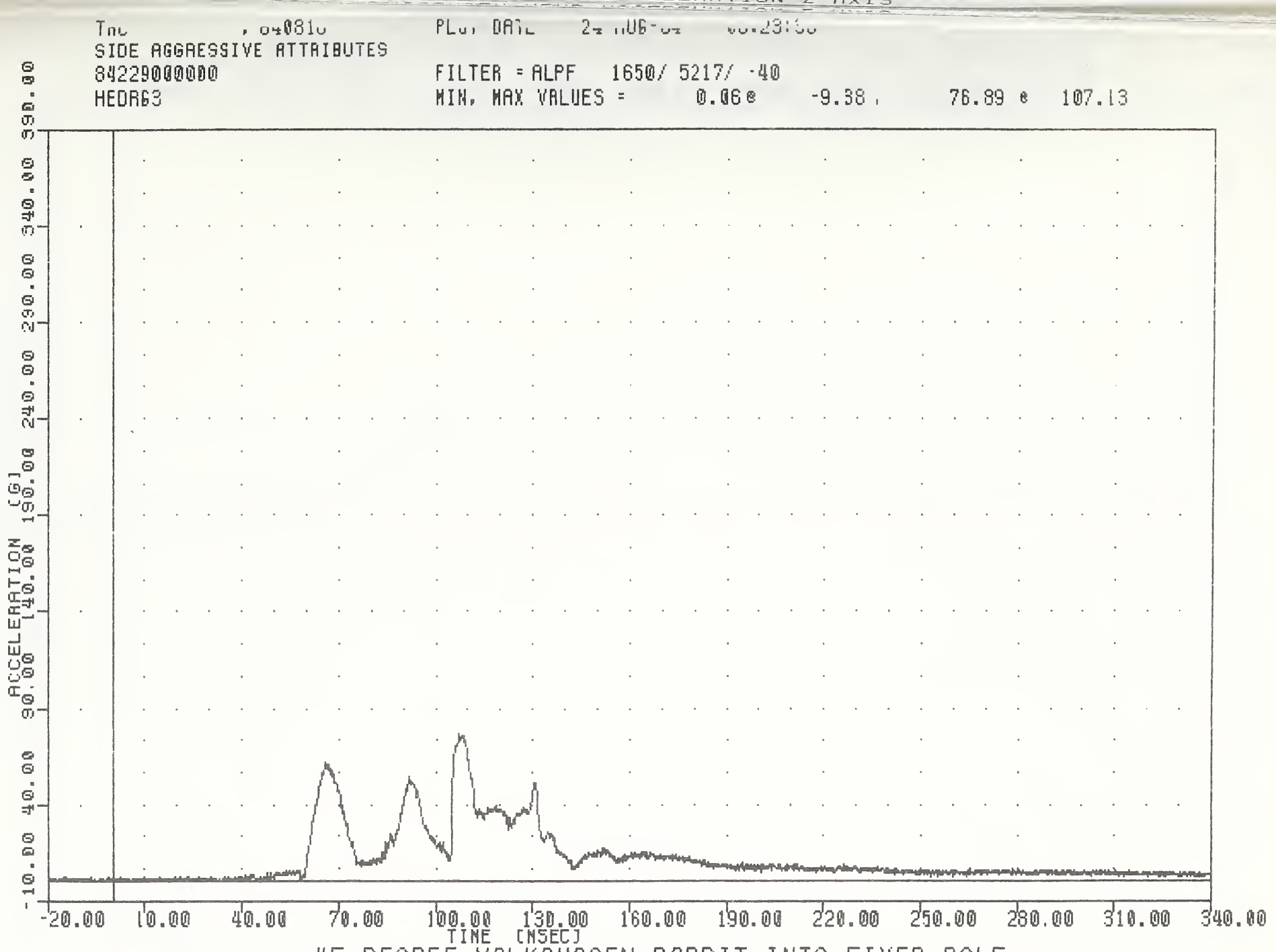
Tnc , 040810 PLOT DATE 24-AUG-84 08:23:36
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = ALPF 1650/ 5217/ -40
HEDY63 MIN, MAX VALUES = -47.53 @ 107.13 , 55.22 @ 65.63



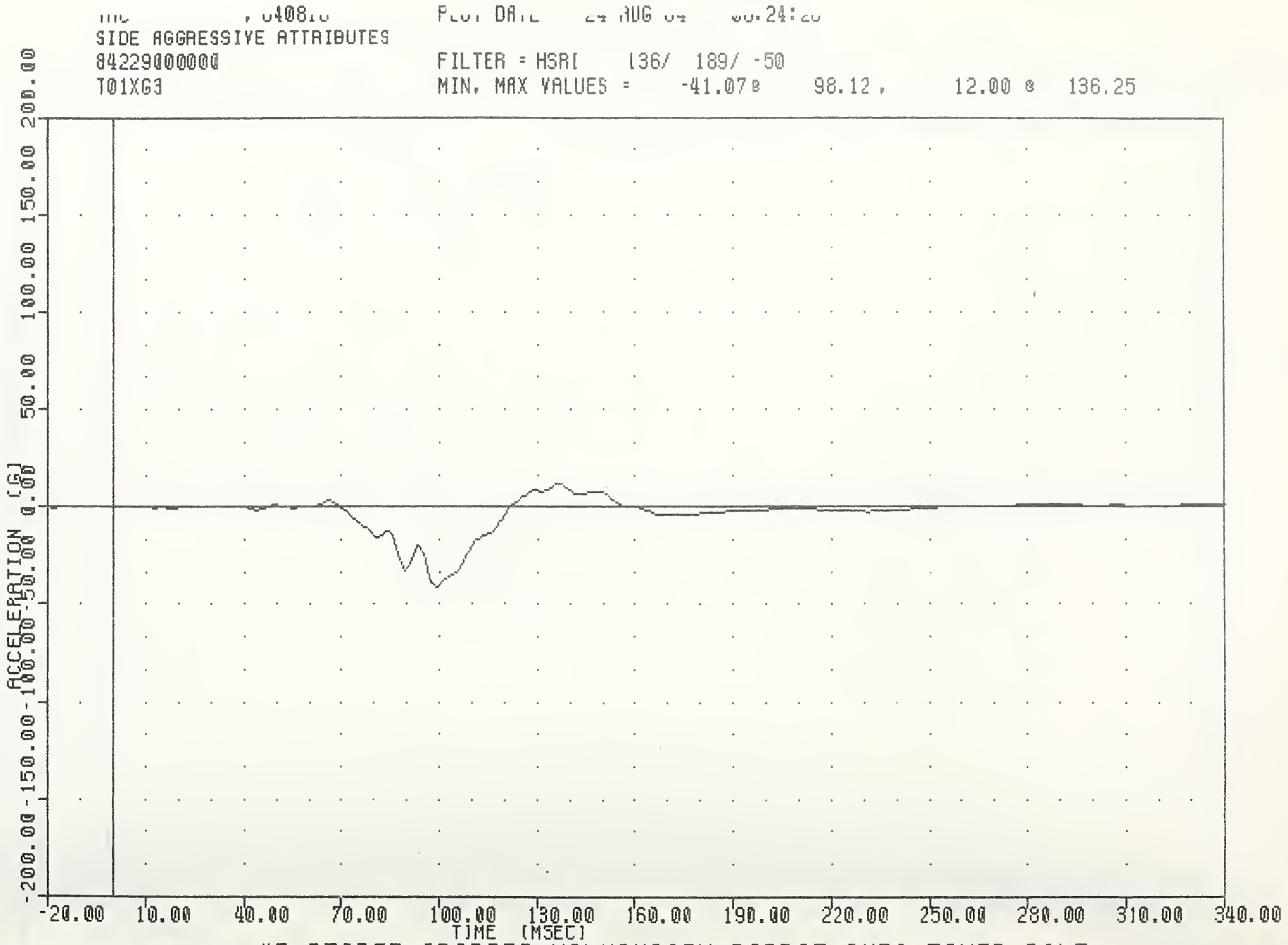
45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER HEAD ACCELERATION Y AXIS



45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER HEAD ACCELERATION Z AXIS

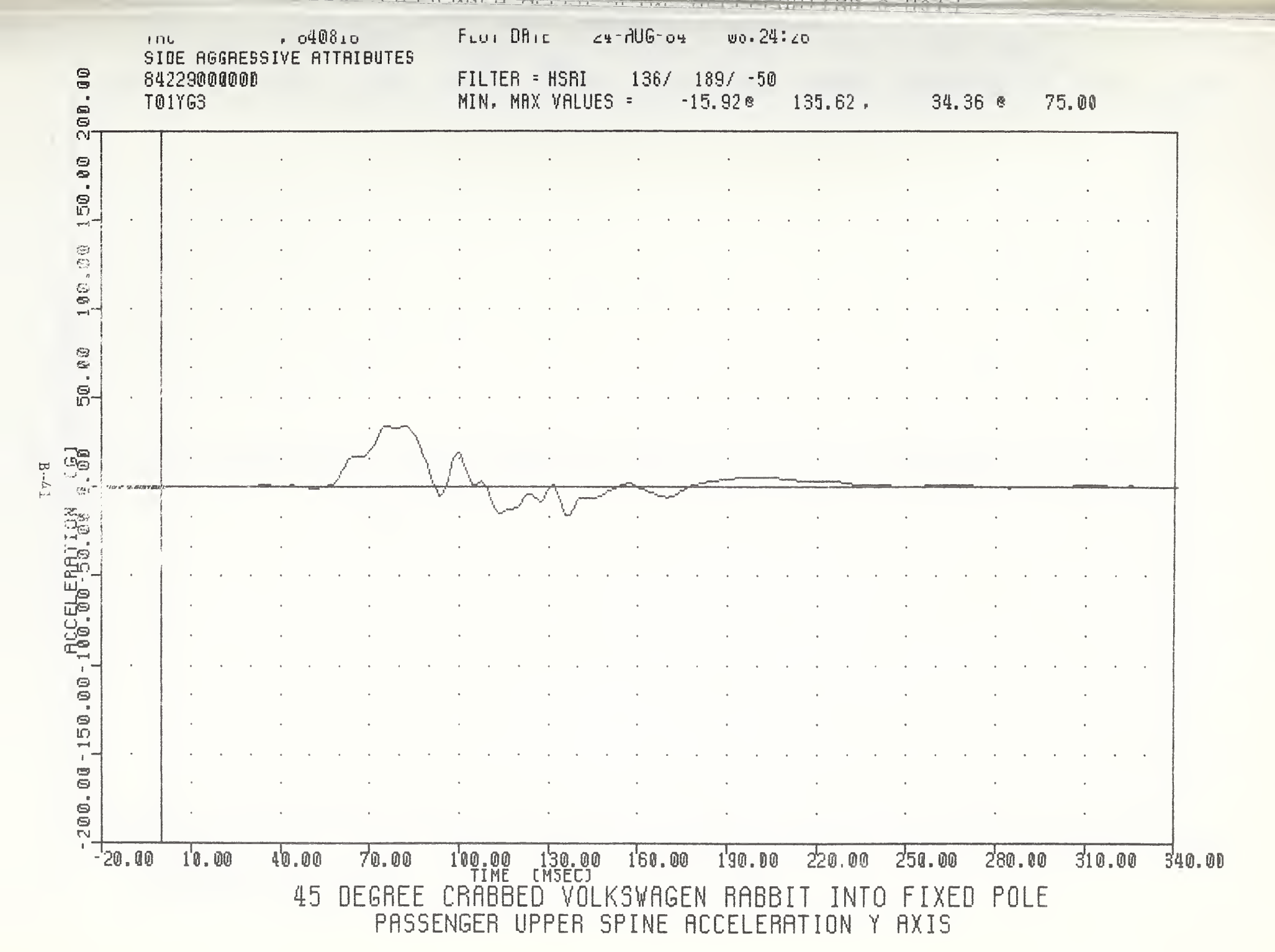


45 DEGREE VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER HEAD RESULTANT

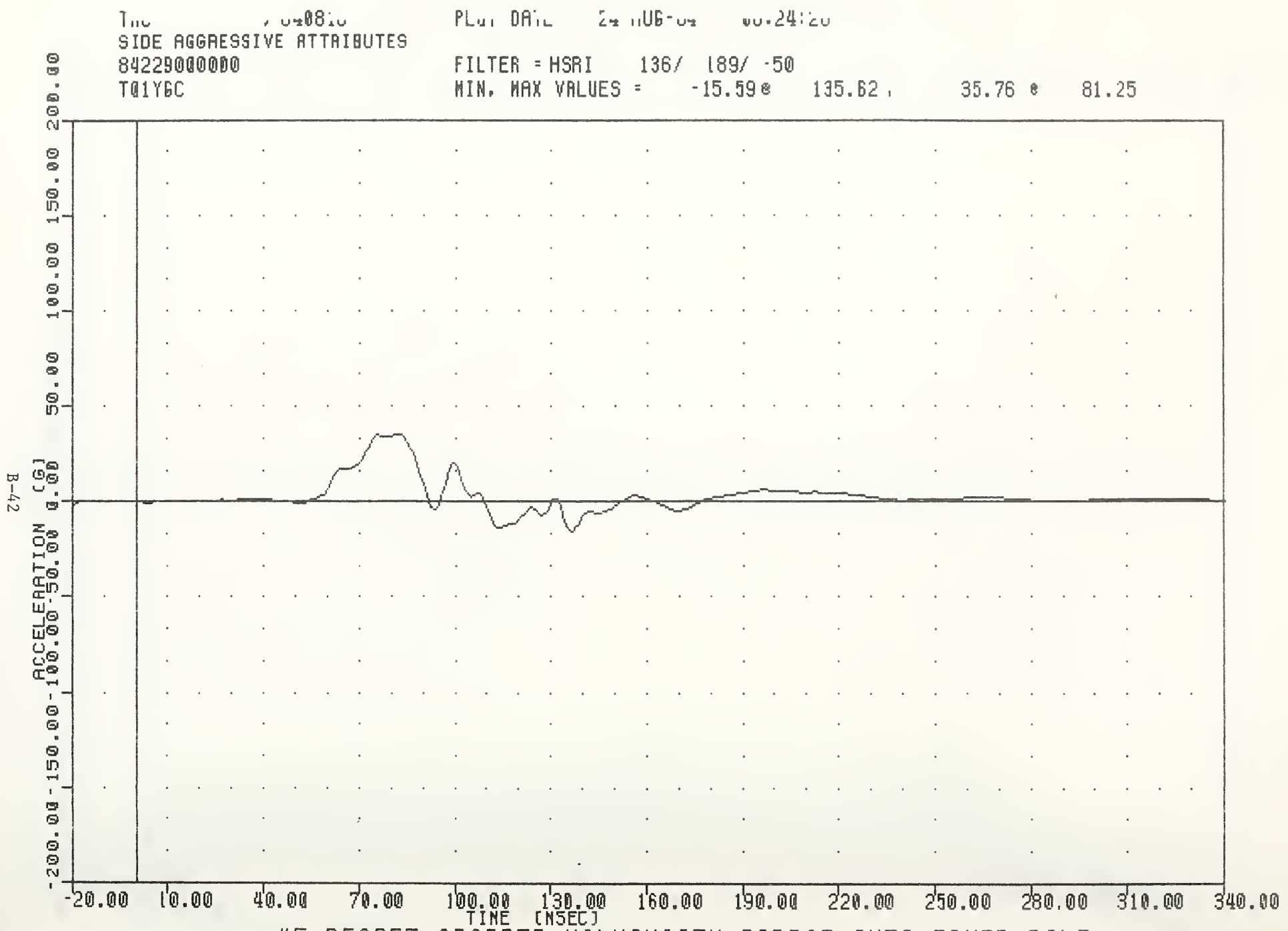


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE

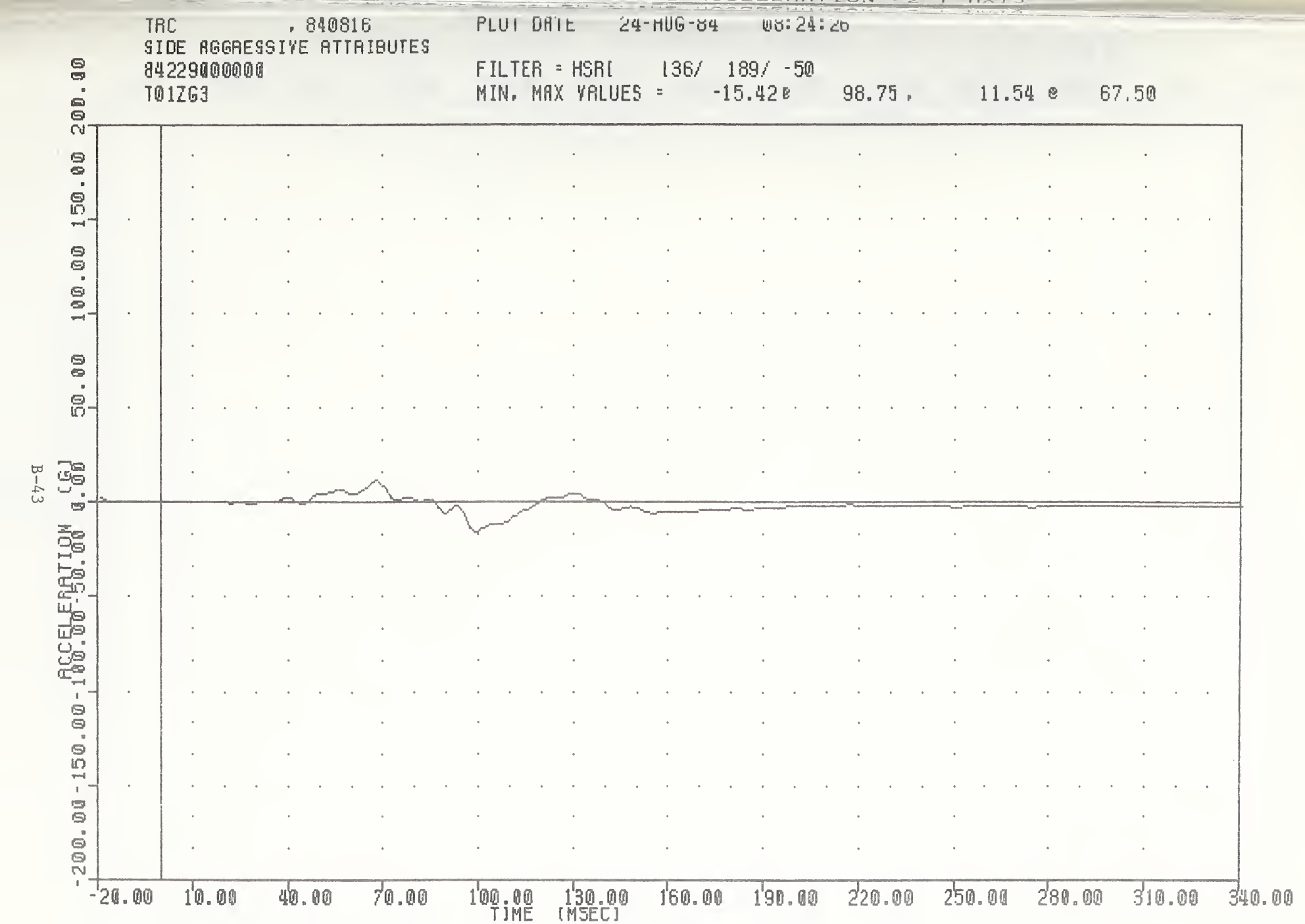
PASSENGER UPPER SPINE ACCELERATION X AXIS



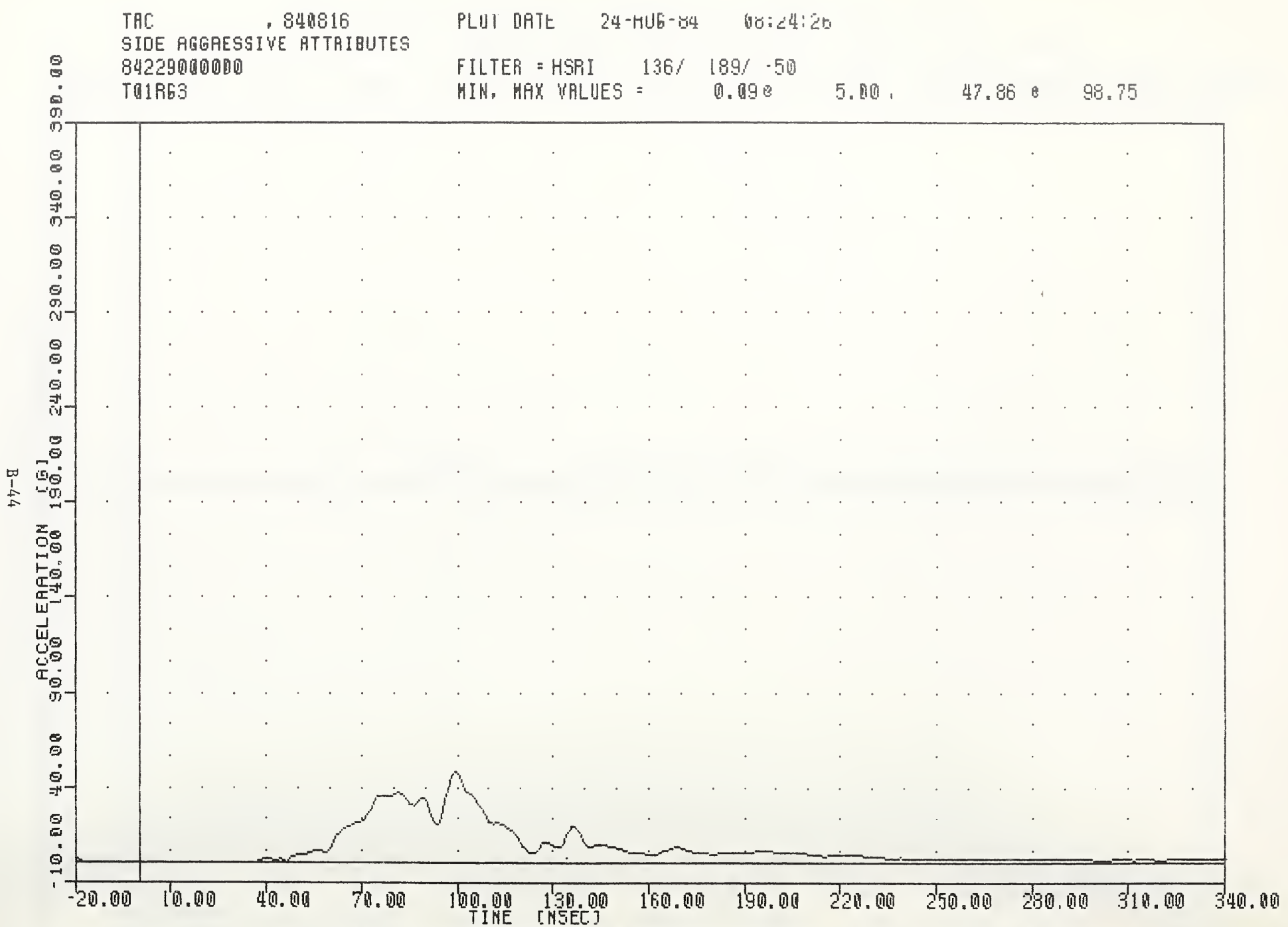
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER UPPER SPINE ACCELERATION Y AXIS

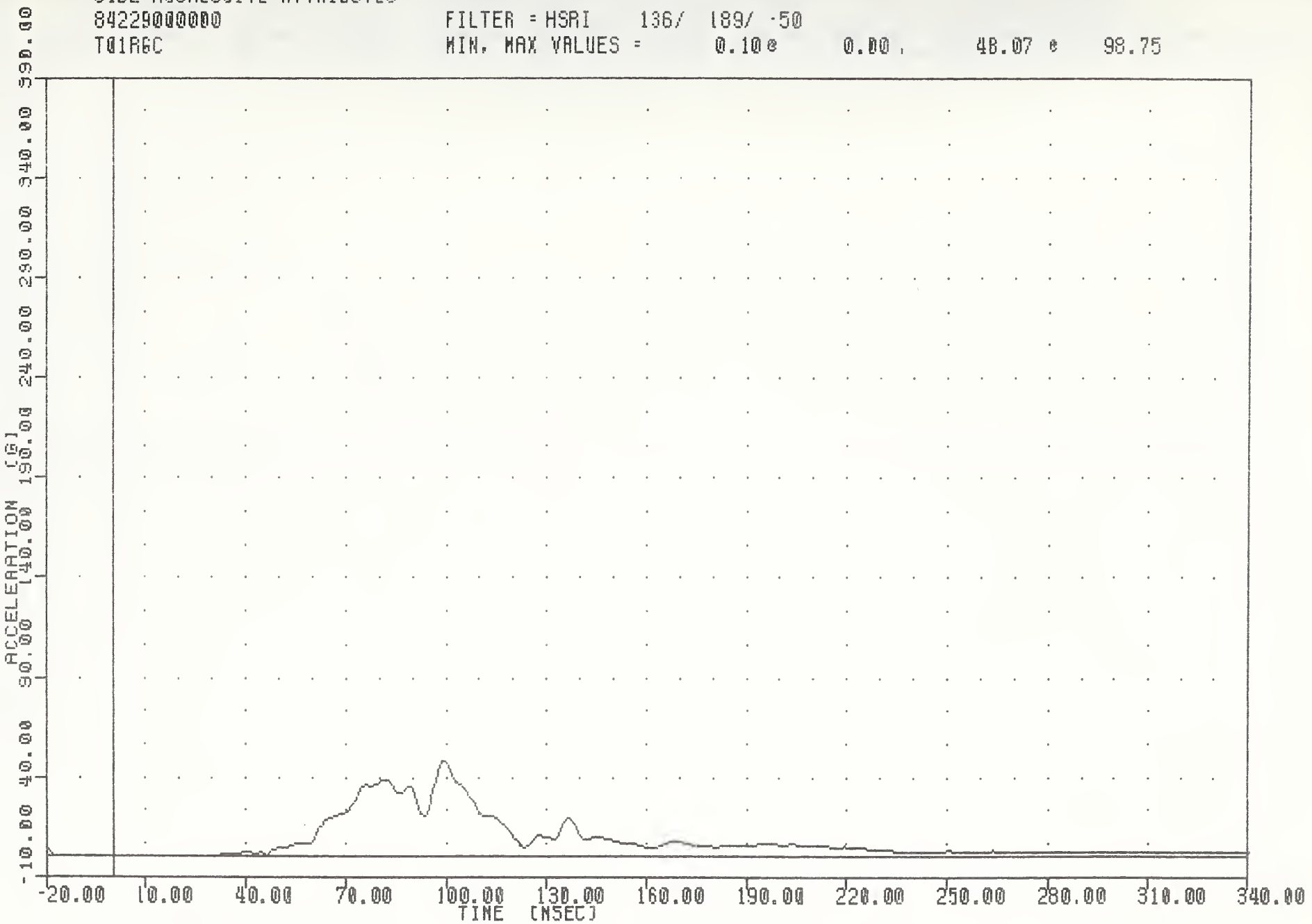


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER UPPER SPINE ACCELERATION #2 Y AXIS

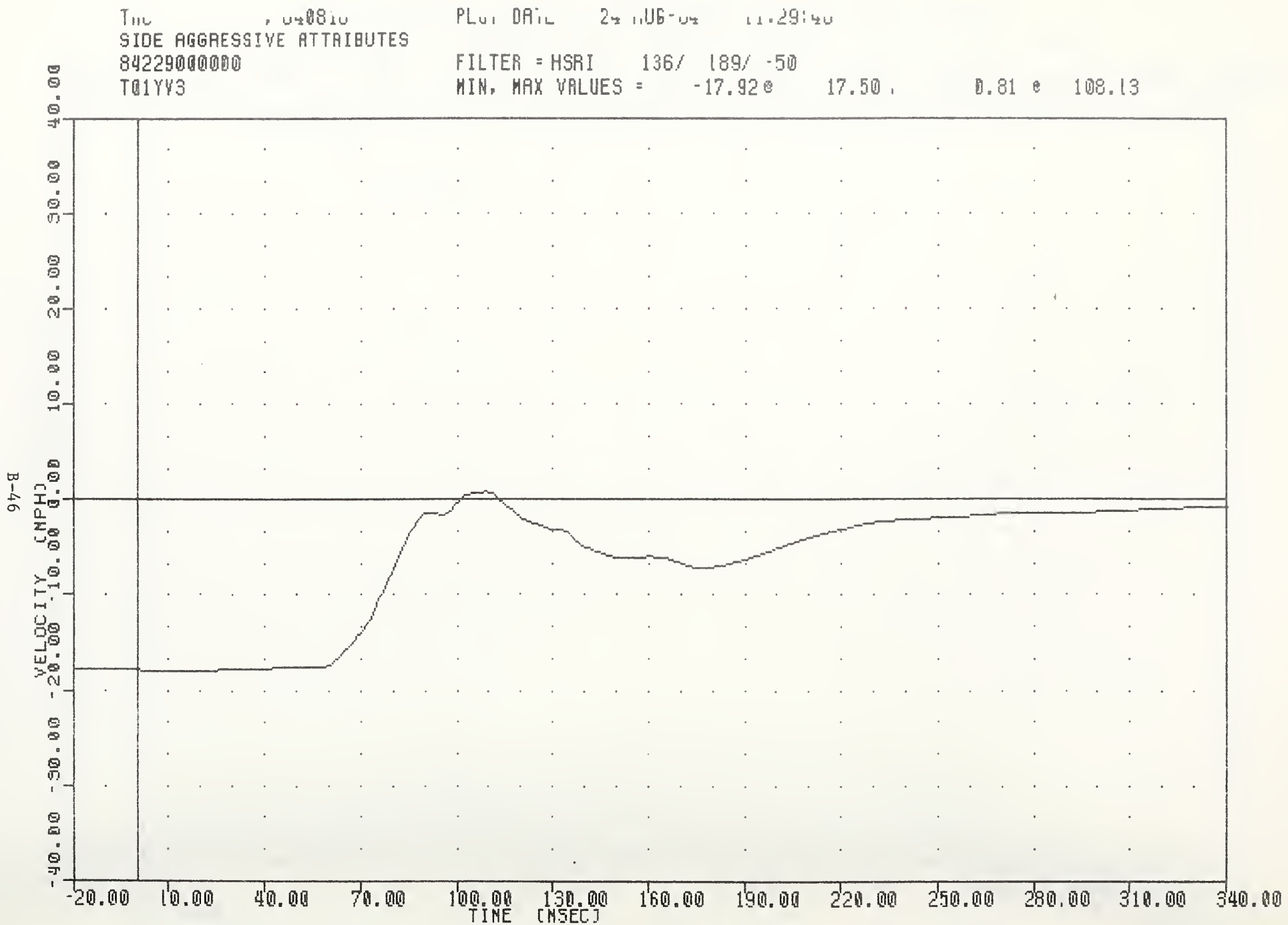


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER UPPER SPINE ACCELERATION Z AXIS


TRC , 840816
PLOT DATE 24-AUG-84 08:24:26
SIDE AGGRESSIVE ATTRIBUTES
842290000D0
FILTER = HSRI 136/ 189/ -50
TQ1R63
MIN, MAX VALUES = 0.09@ 5.00, 47.86@ 98.75
ACCELERATION [G]
-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME [MSEC]
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER UPPER SPINE RESULTANT



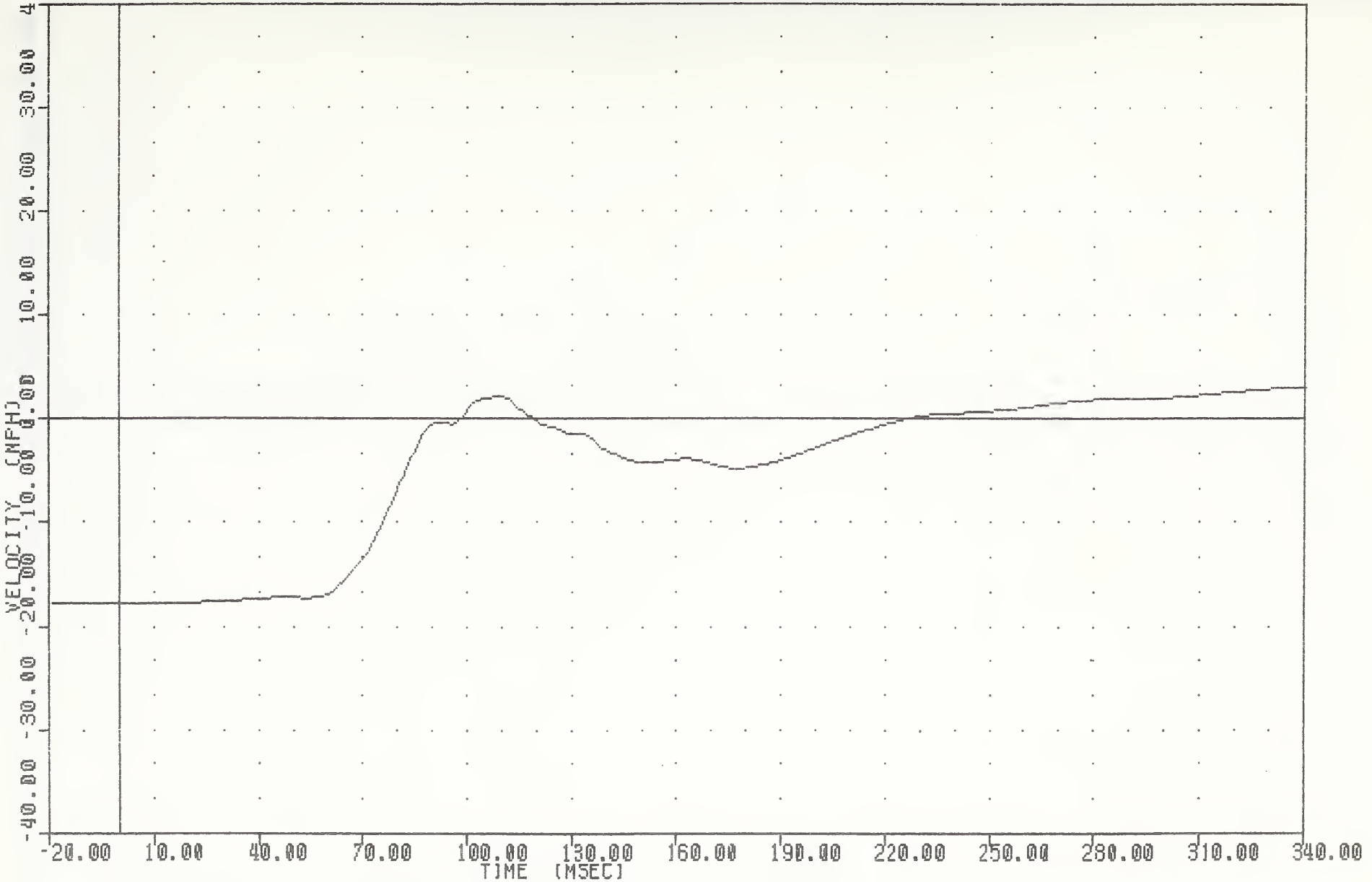
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER UPPER SPINE RESULTANT USING T01YGC



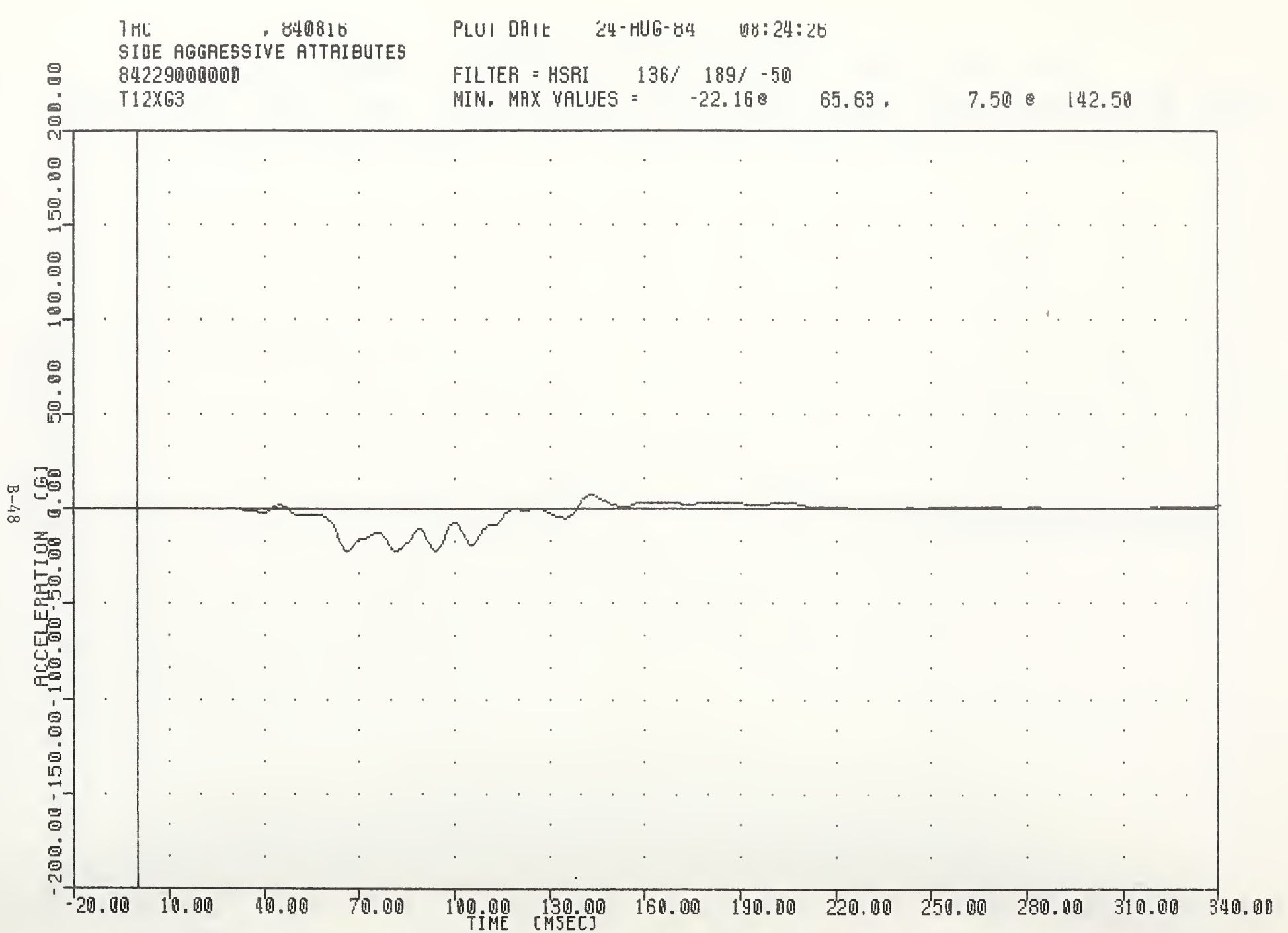
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T01YG3

SIDE AGGRESSIVE ATTRIBUTES
84229000000
T01YYC

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -17.75 @ 6.25 , 3.10 @ 340.00

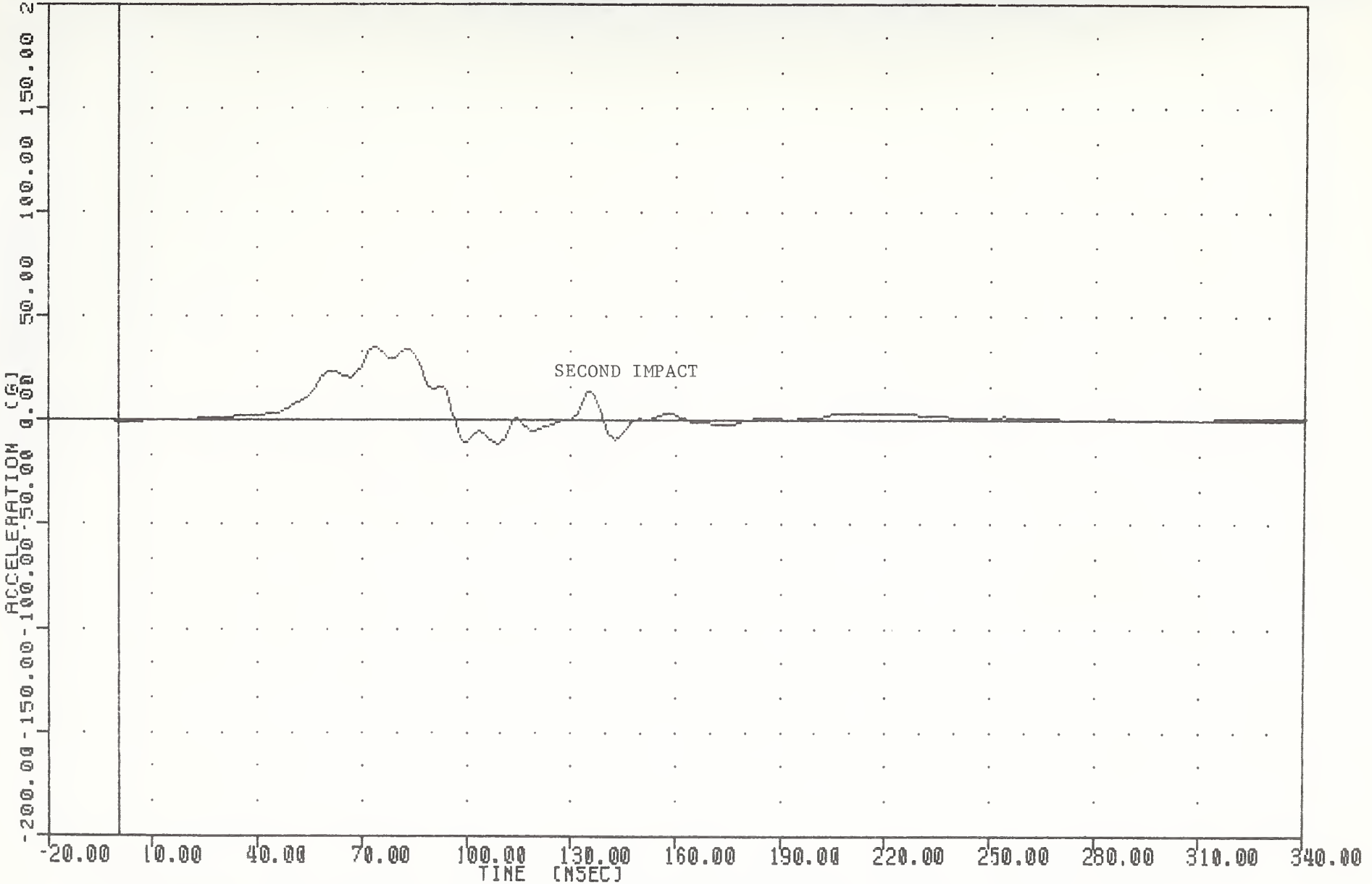


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T01YGC

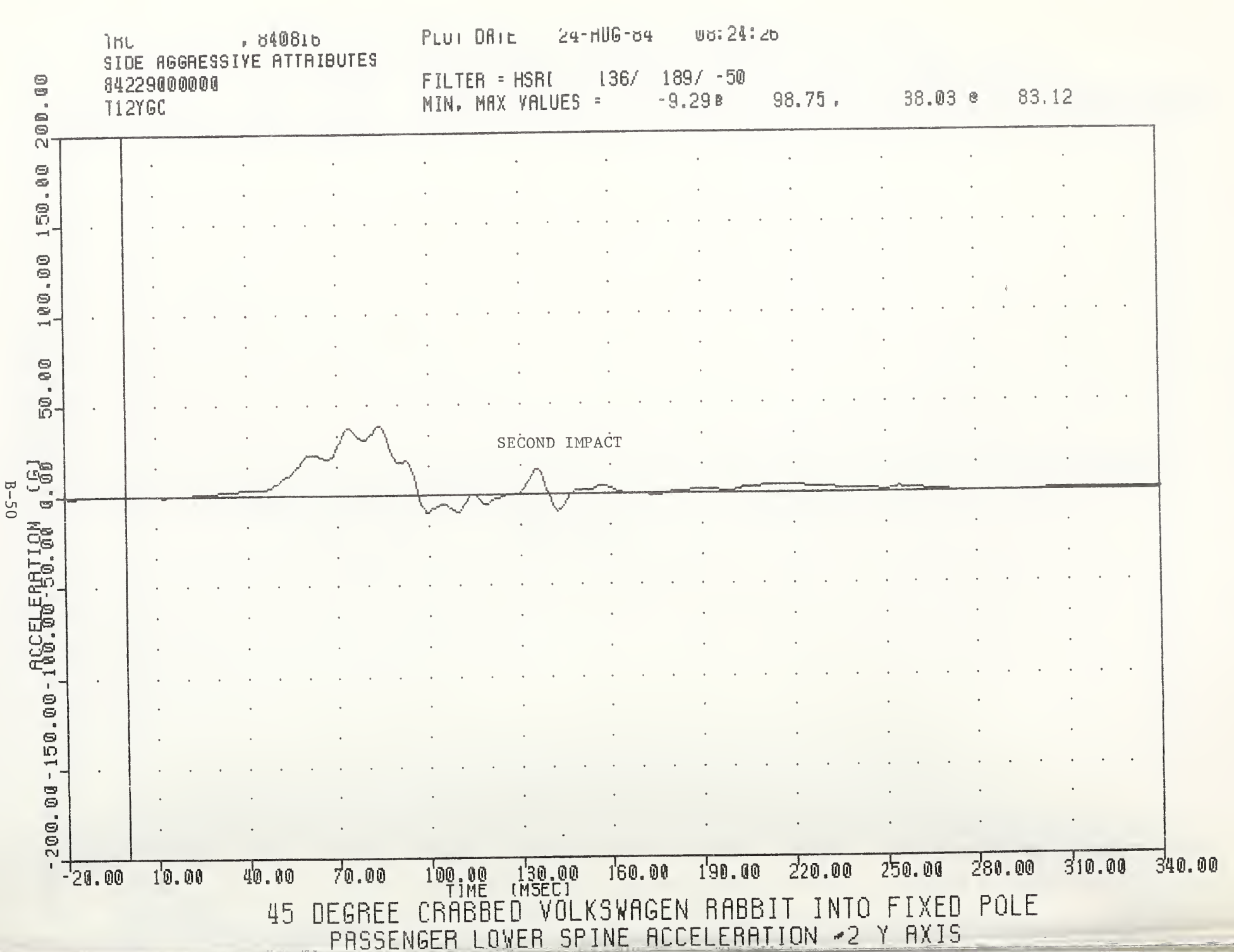


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LOWER SPINE ACCELERATION X AXIS

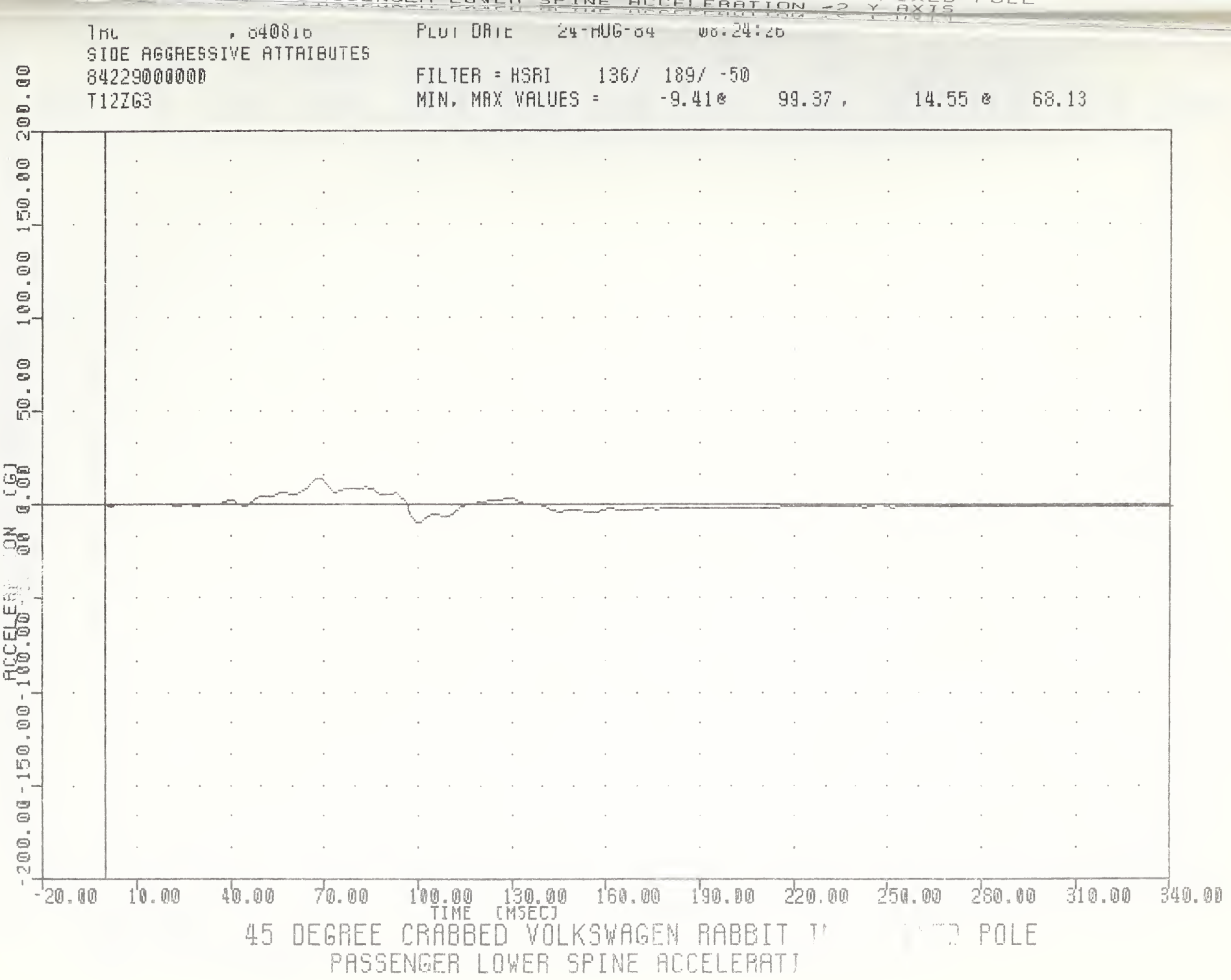
THC , 840816 PLOT DATE 24-AUG-84 08:24:26
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12Y63 MIN, MAX VALUES = -11.21 @ 108.13 , 35.45 @ 73.13



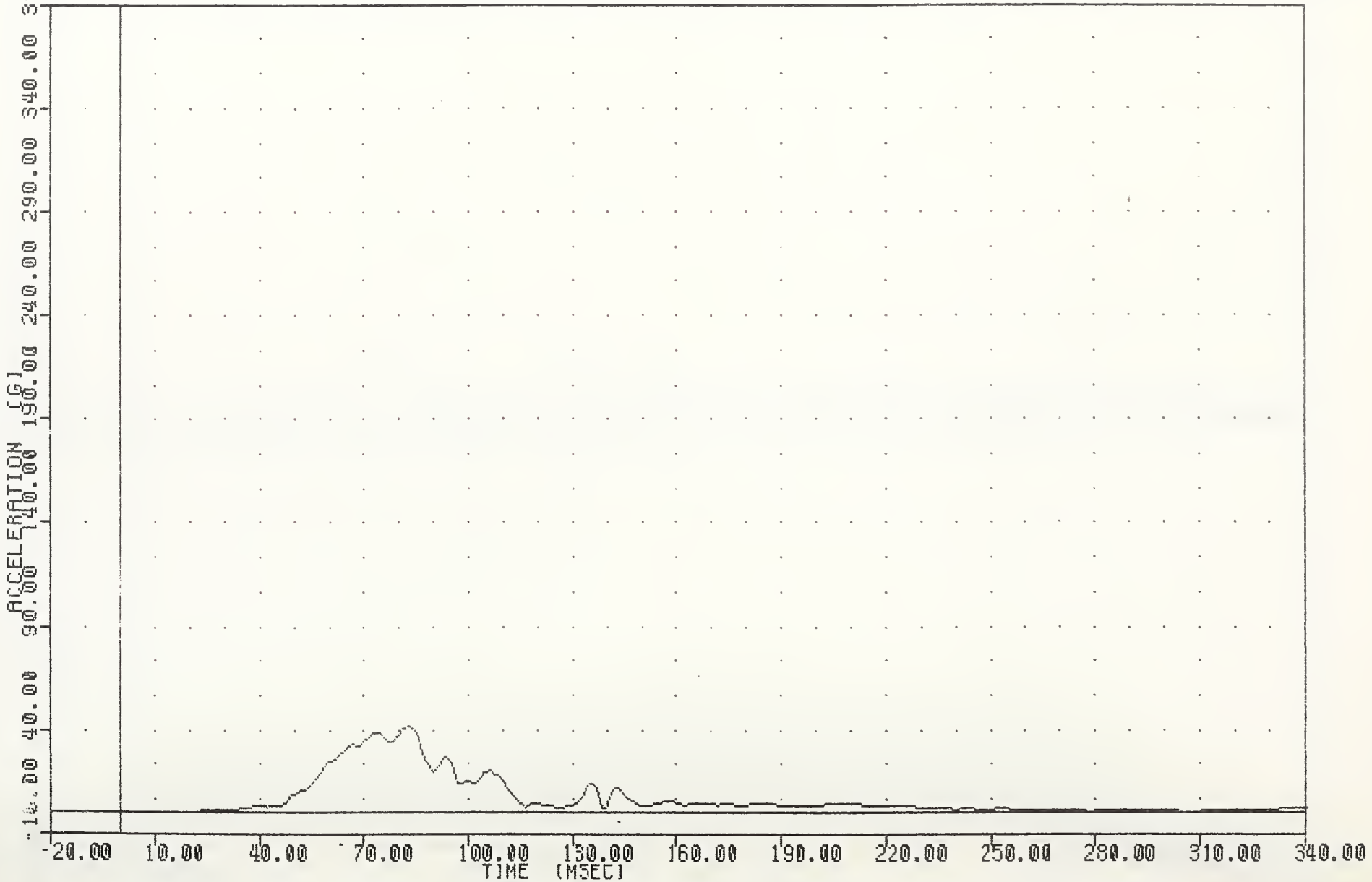
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LOWER SPINE ACCELERATION Y AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LOWER SPINE ACCELERATION -Z Y AXIS

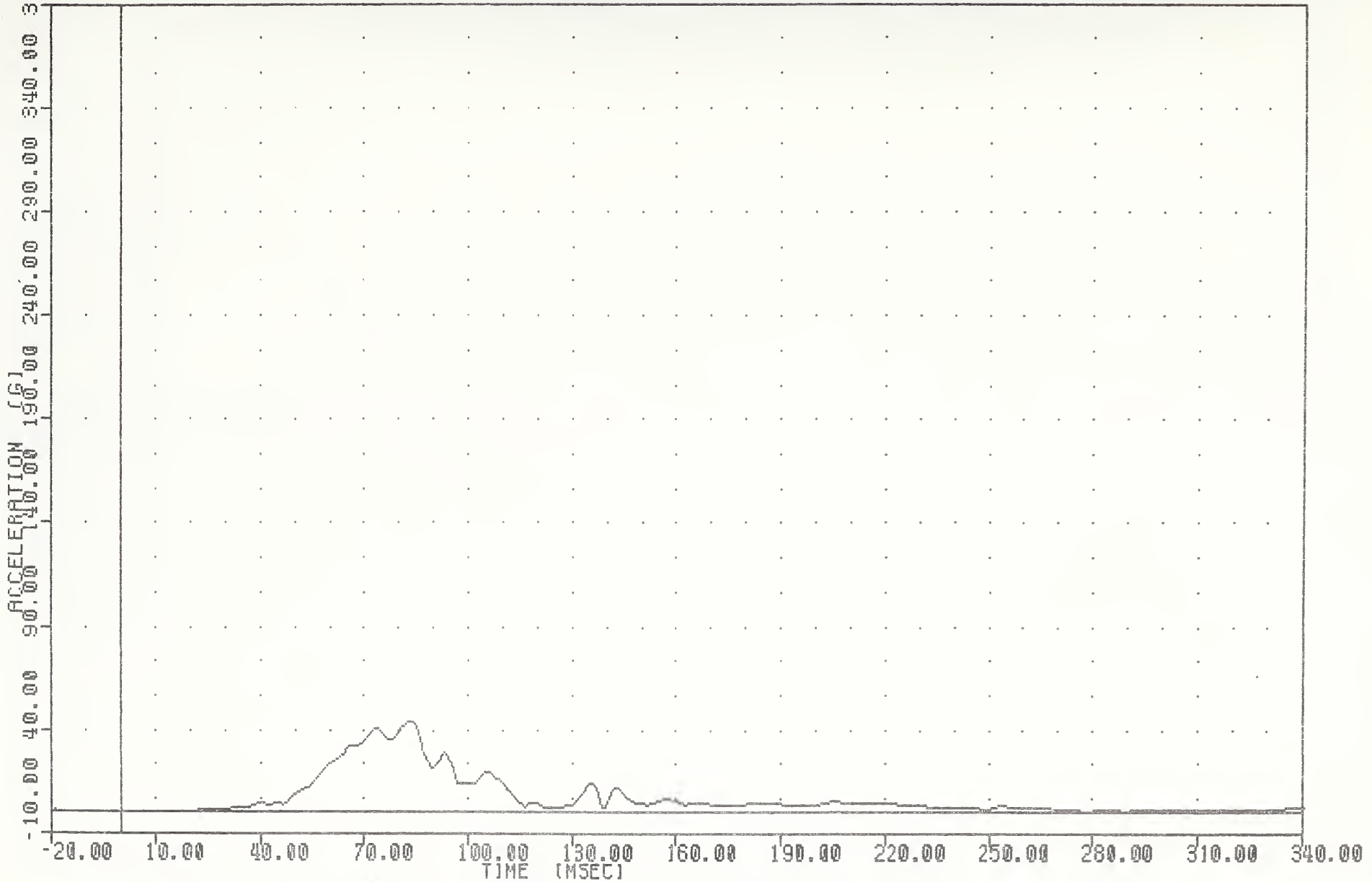

TRL , 040816 PLOT DATE 24-AUG-04 06:24:26
SIDE AGGRESSIVE ATTRIBUTES
84229000000
T12ZG3
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -9.41@ 99.37 , 14.55 @ 68.13
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
ACCELERATION [G]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
45 DEGREE CRABBED VOLKSWAGEN RABBIT
POLE
PASSENGER LOWER SPINE ACCELERATI

Inc , 040810 Plot Date 24-AUG-04 10:24:20
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12RG3 MIN, MAX VALUES = 0.12 @ 14.37 , 41.38 @ 81.88



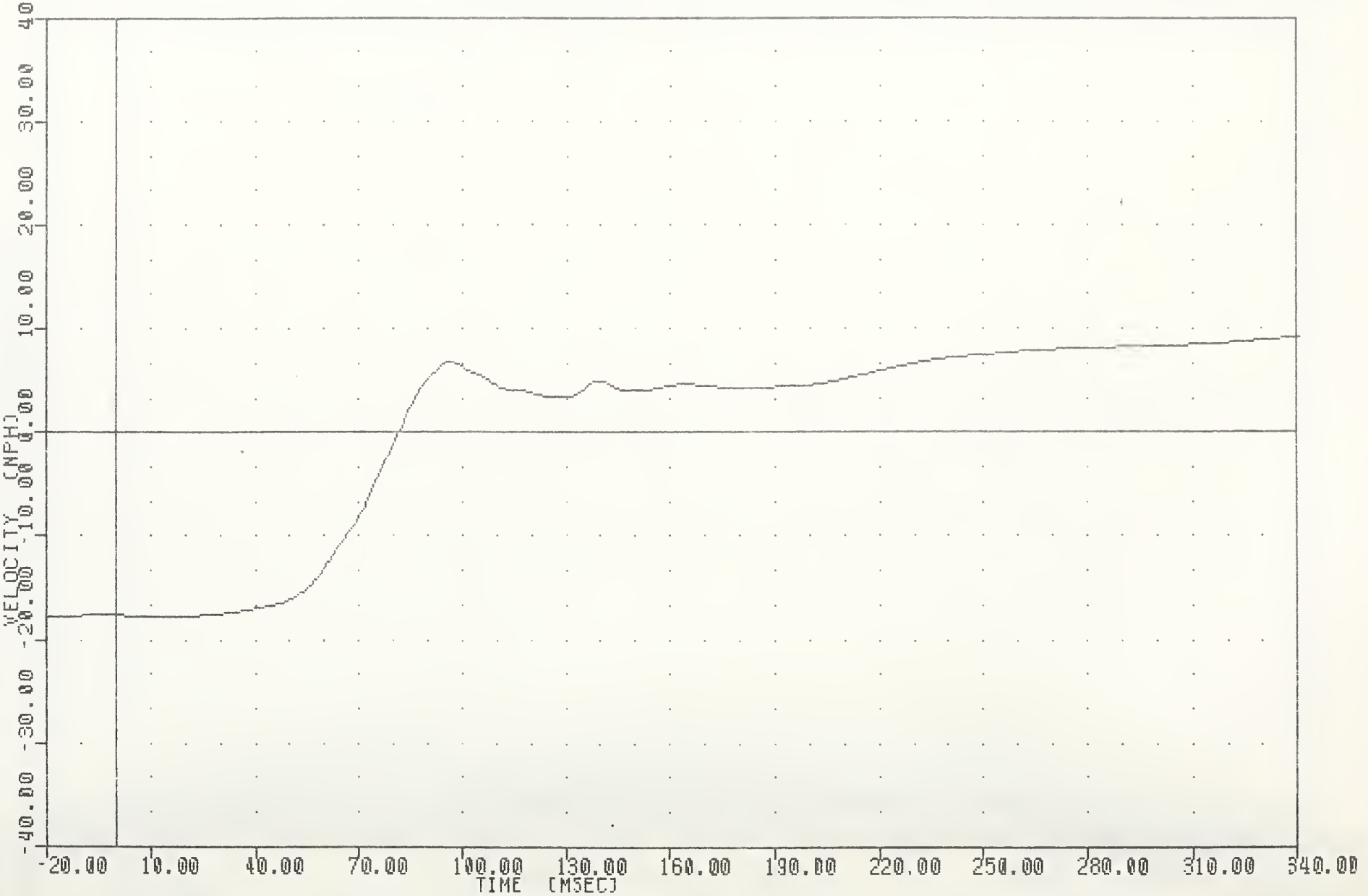
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LOWER SPINE RESULTANT

Inc , 040810 PLOT DATE 24-AUG-04 09:25:56
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSR(136/ 189/ -50
T12RGC MIN, MAX VALUES = 0.09@ 14.37, 44.20@ 82.50



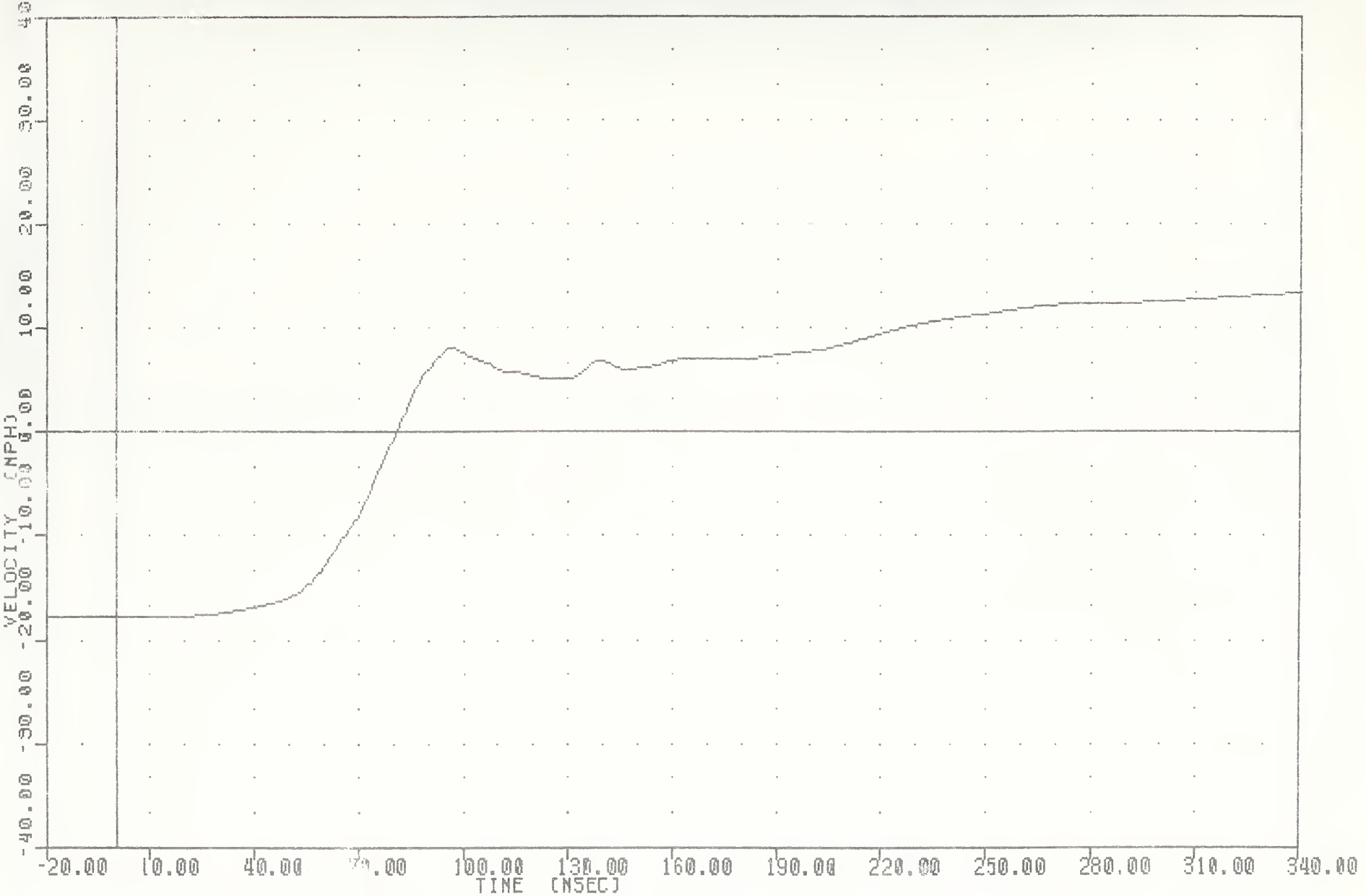
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LOWER SPINE RESULTANT USING T12YGC

TRC , 840816 PLOT DATE 24-AUG-84 11:29:48
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
T12YV3 MIN, MAX VALUES = -17.71@ 19.38, 9.24 @ 340.00

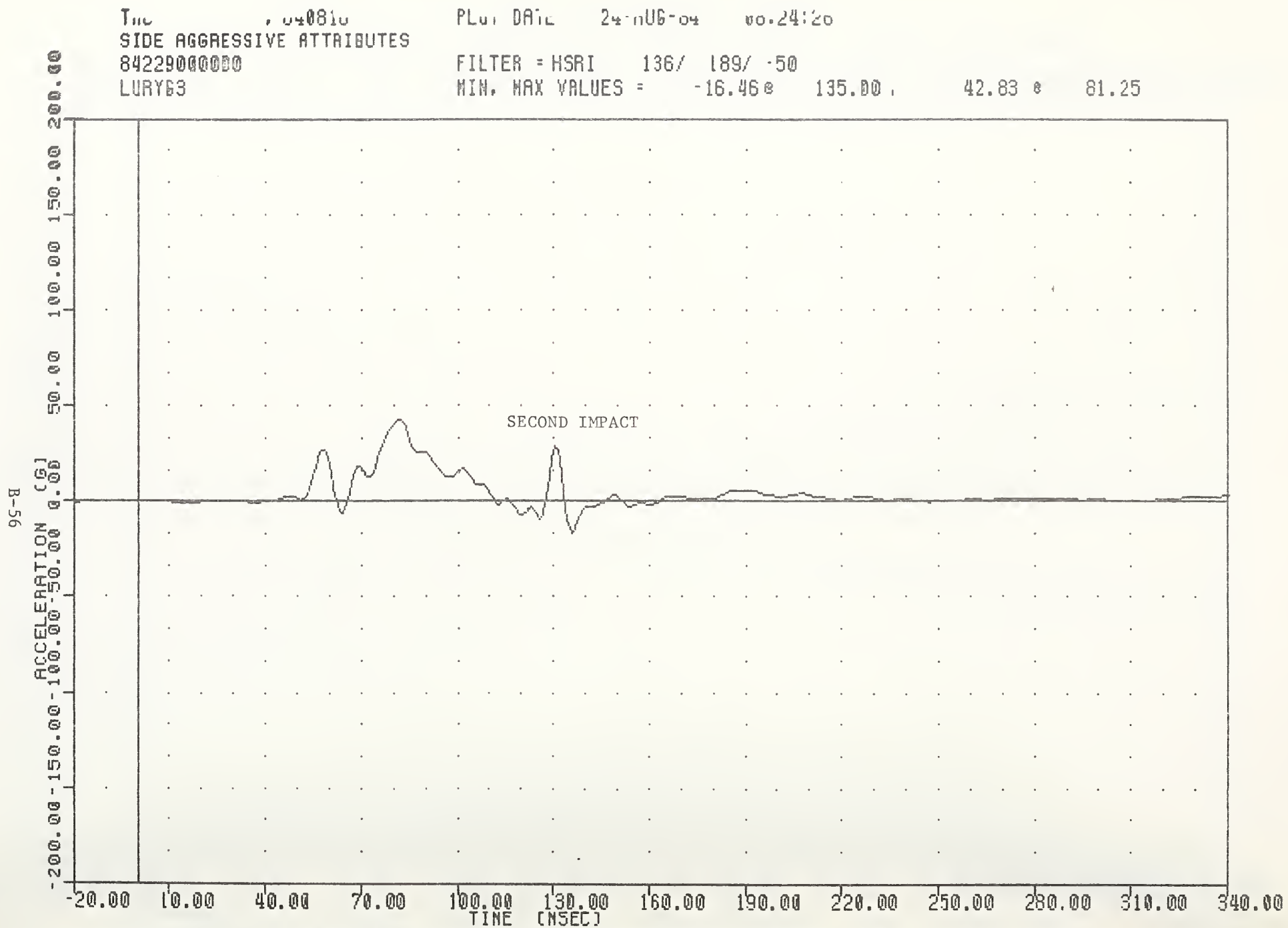


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T12YG3

THC , 840816 PLOT DATE 24-AUG-84 11:29:48
SIDE AGGRESSIVE ATTRIBUTES
84229@@@@@@ FILTER = HSRI 136/ 189/ -50
T12YYC MIN, MAX VALUES = -17.76 @ -7.50 , 13.43 @ 340.00

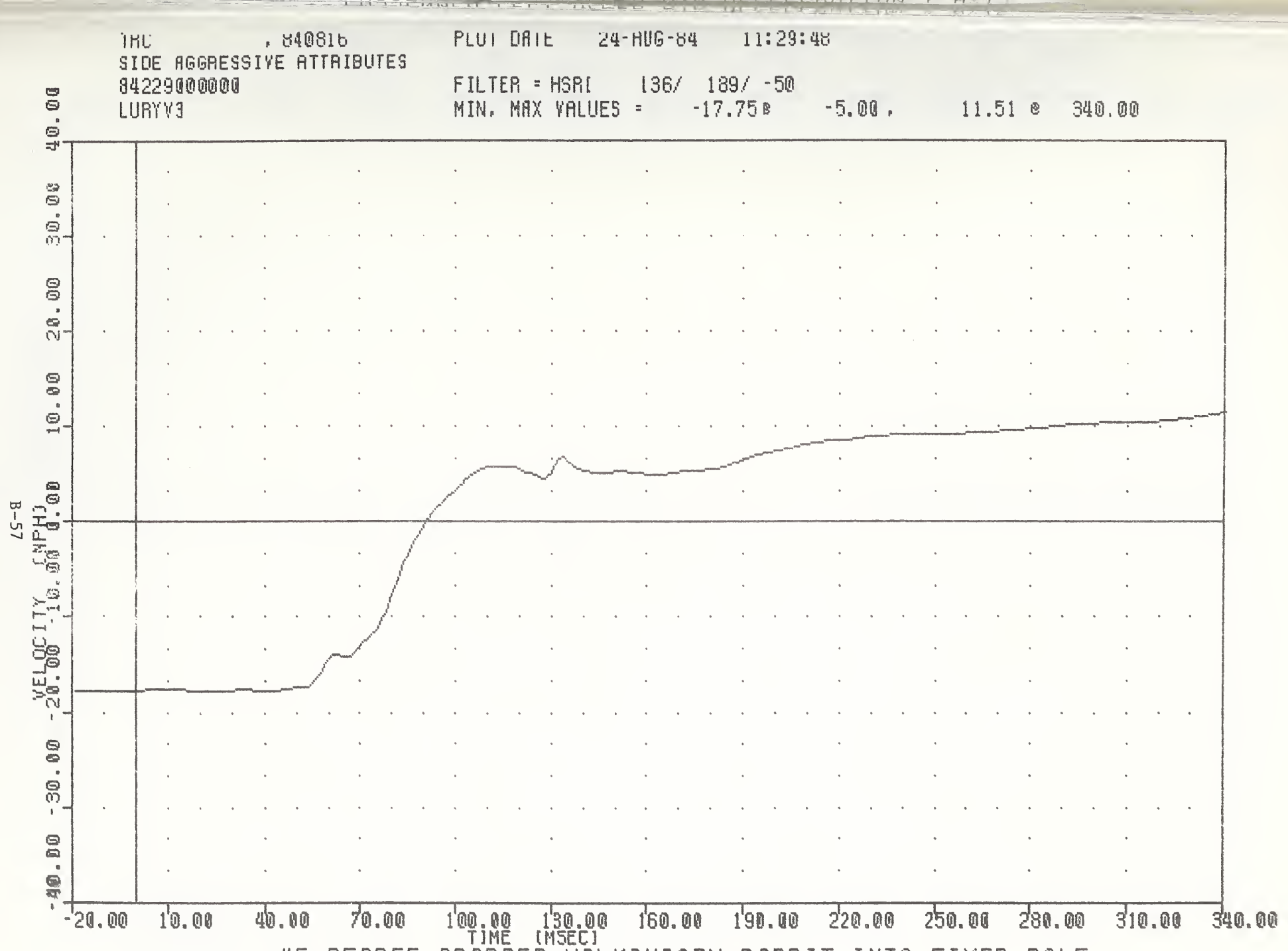


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING T12YGC

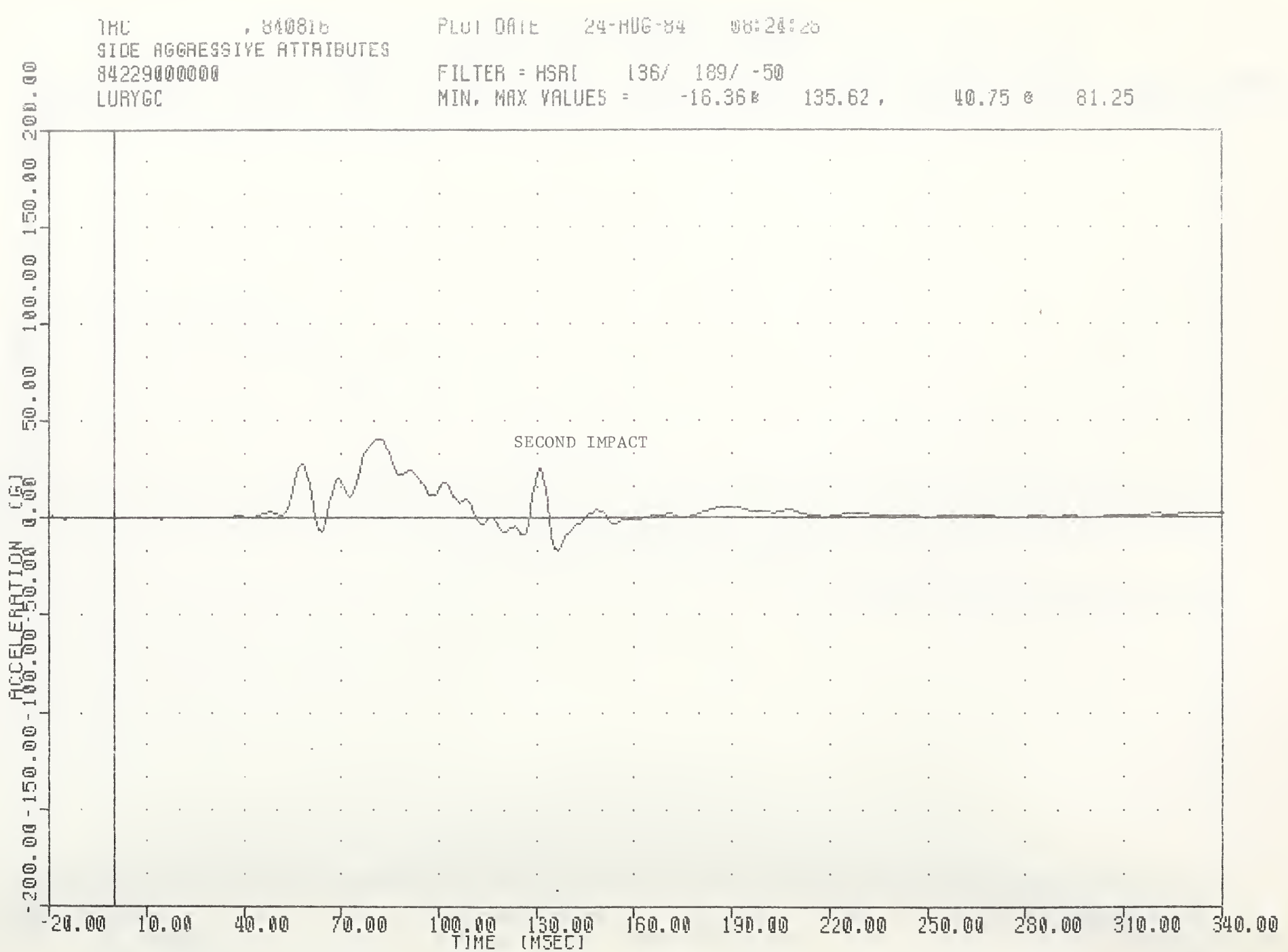


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE

PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

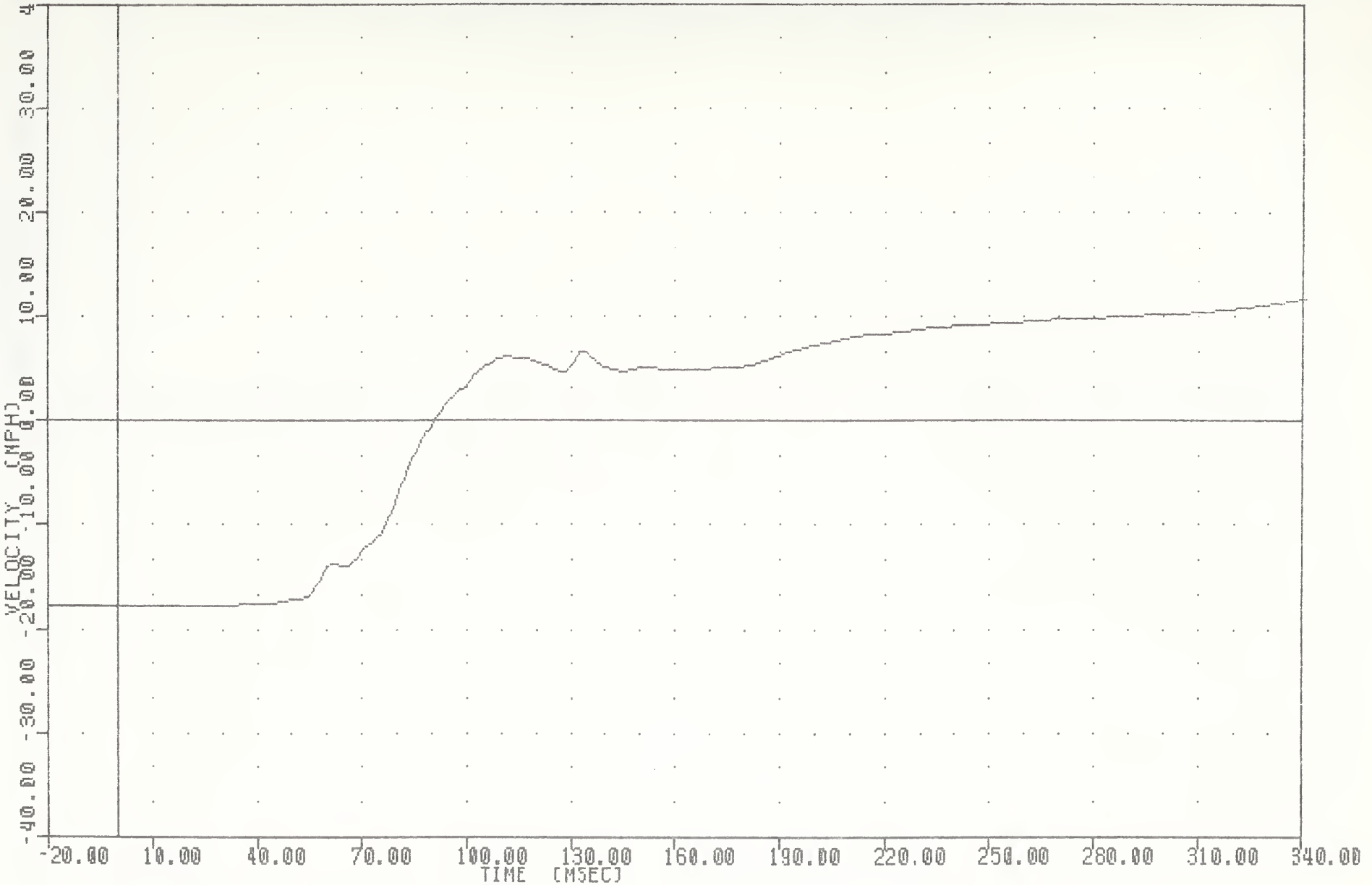


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LURYG3

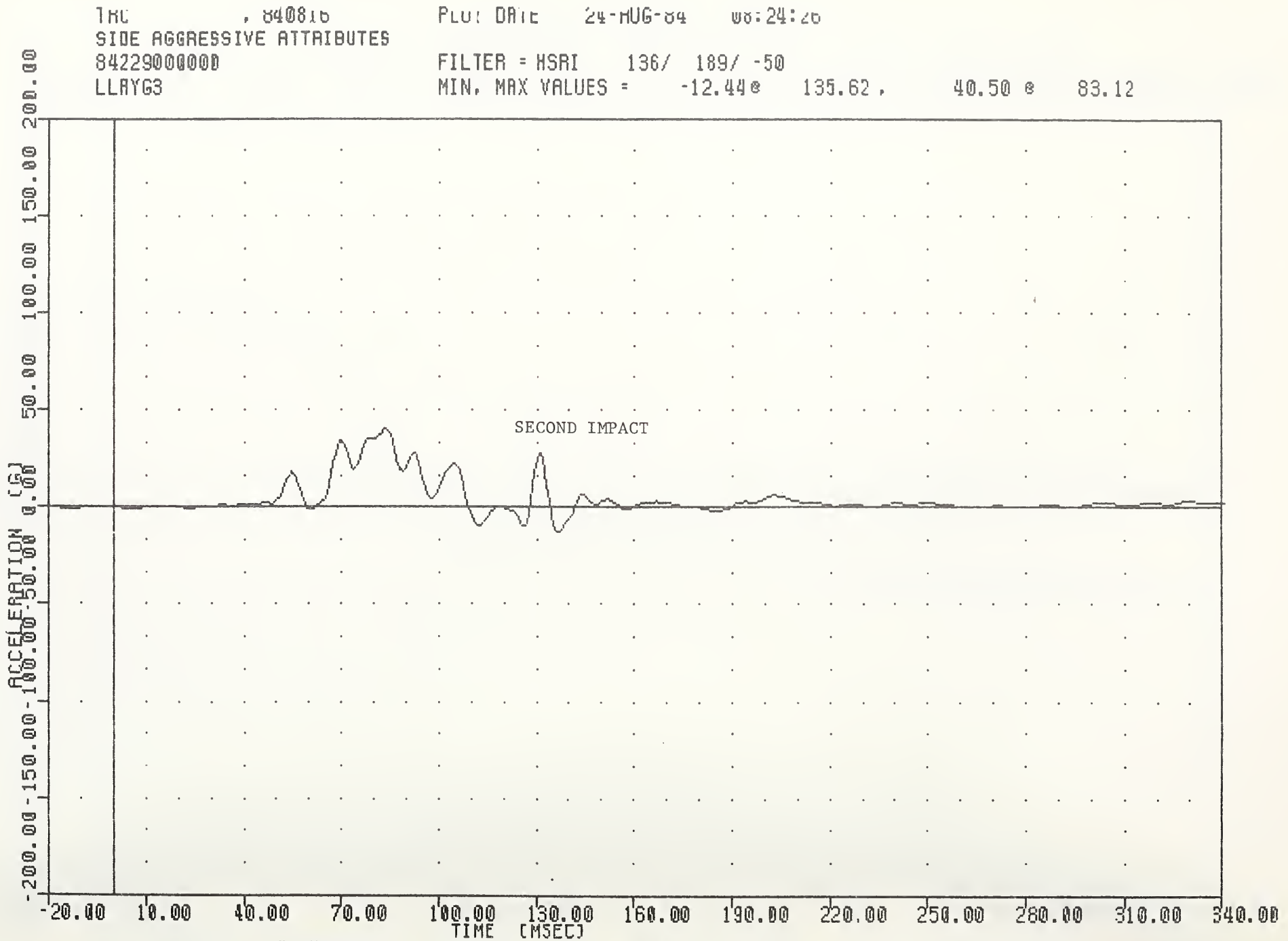


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LEFT UPPER RIB ACCELERATION #2 Y AXIS

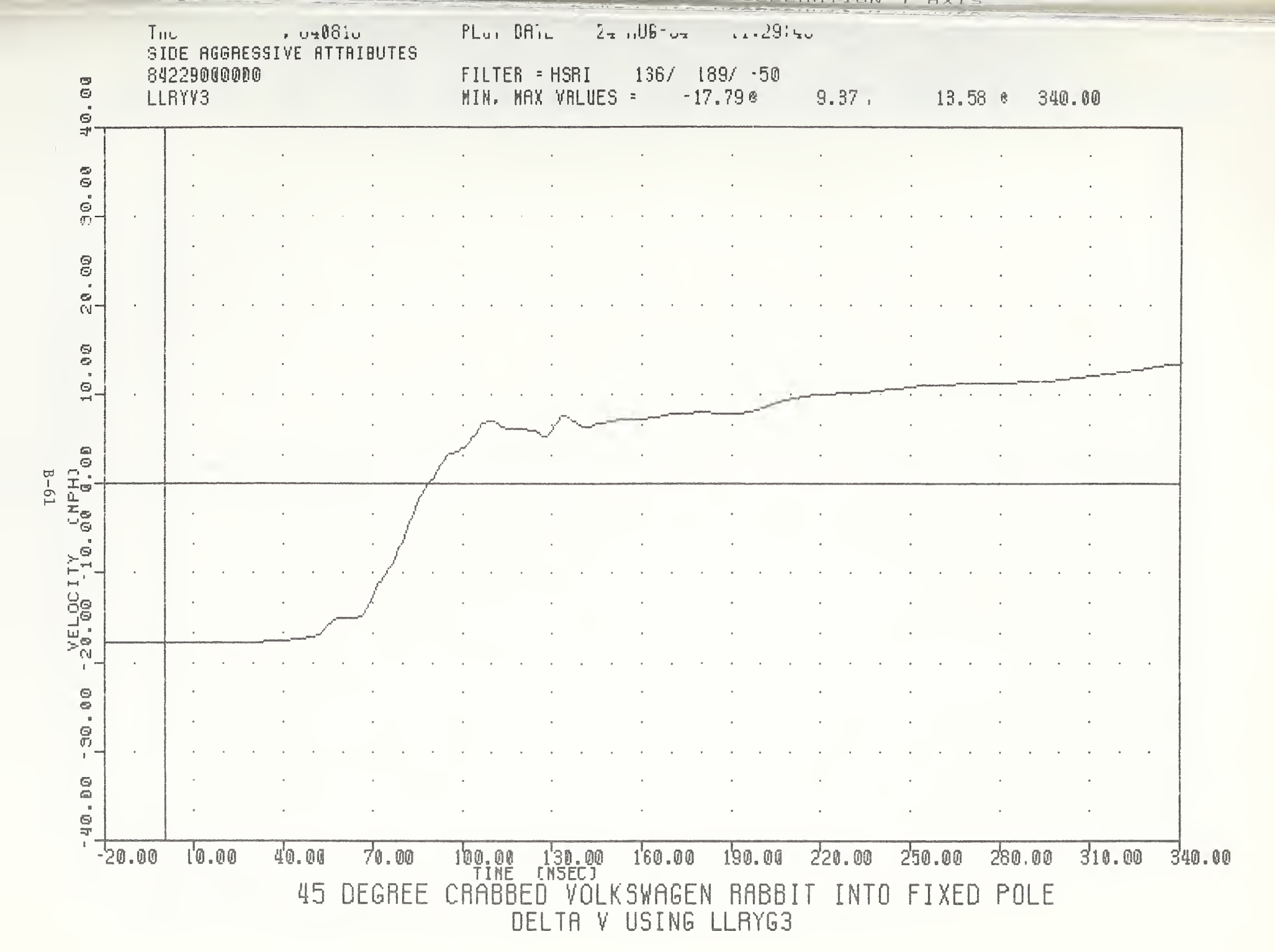
TAL , 840816 PLOT DATE 24-AUG-84 11:29:48
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = HSRI 136/ 189/ -50
LURYVC MIN, MAX VALUES = -17.76 @ 5.00 , 11.72 @ 340.00



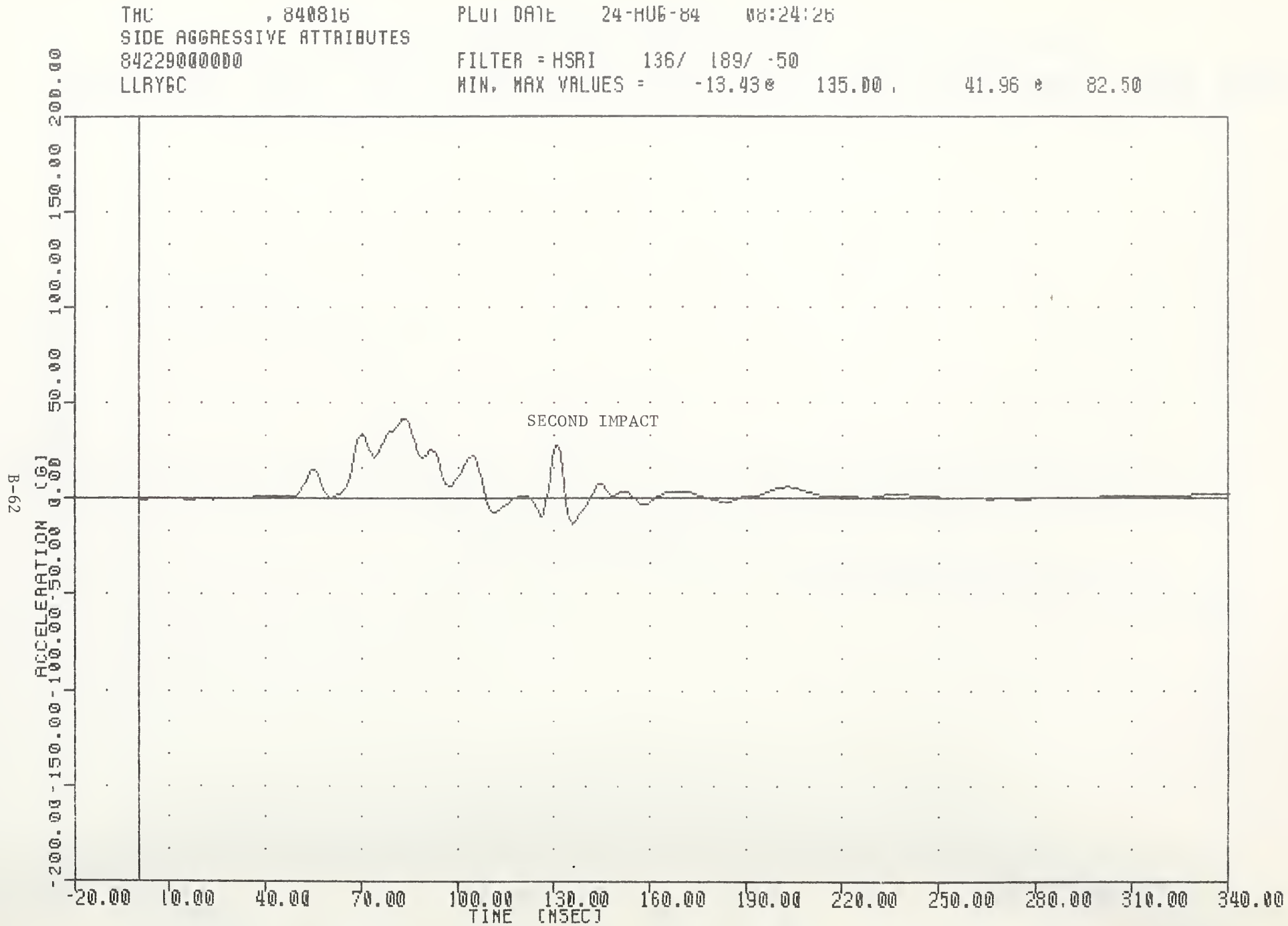
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LURYGC



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS



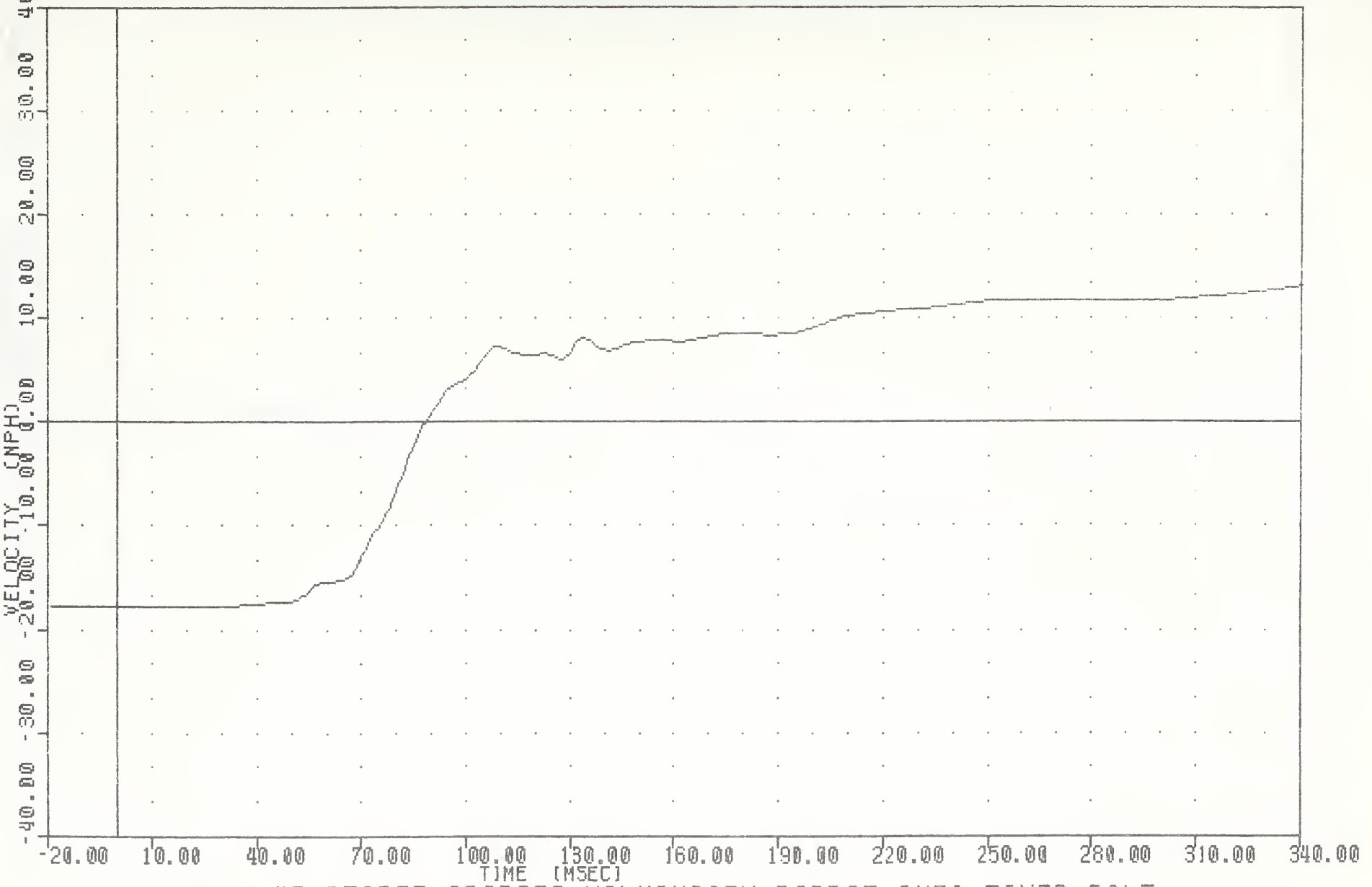
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LLRYG3



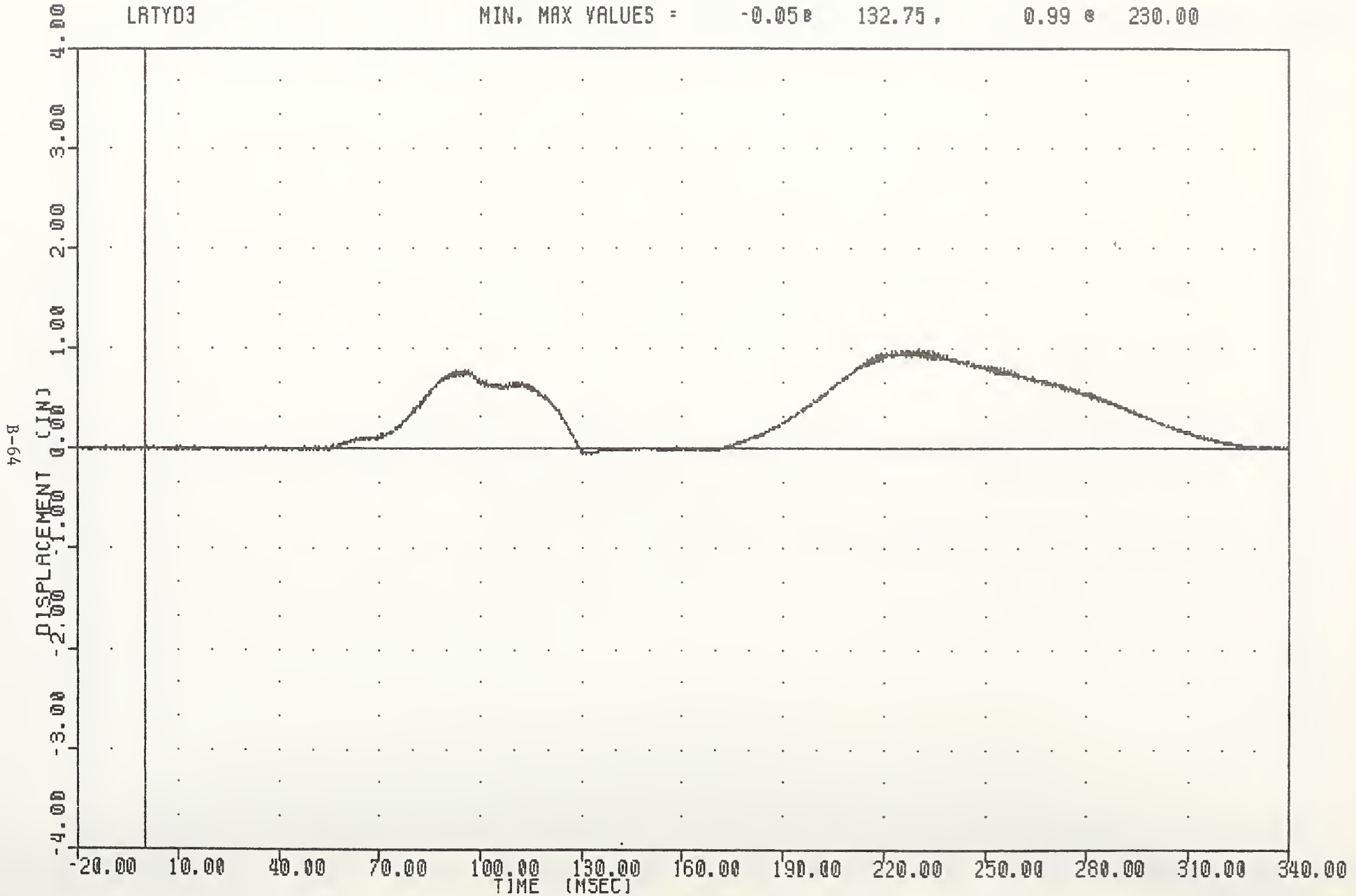
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LEFT LOWER RIB ACCELERATION -2 Y AXIS

SIDE AGGRESSIVE ATTRIBUTES
84229000000
LLRYVC

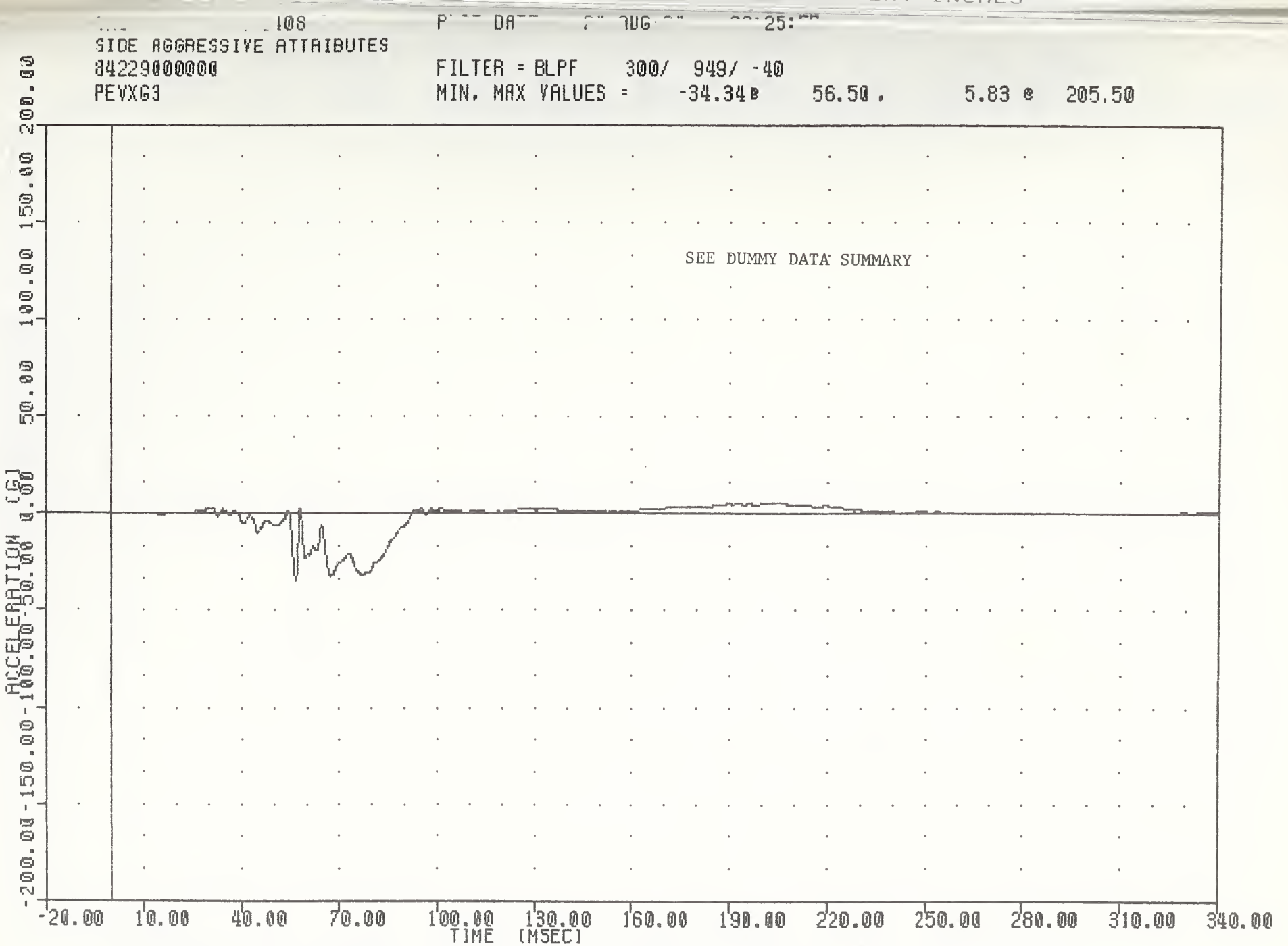
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -17.77 @ 25.00 , 13.15 @ 340.00



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LLRYGC

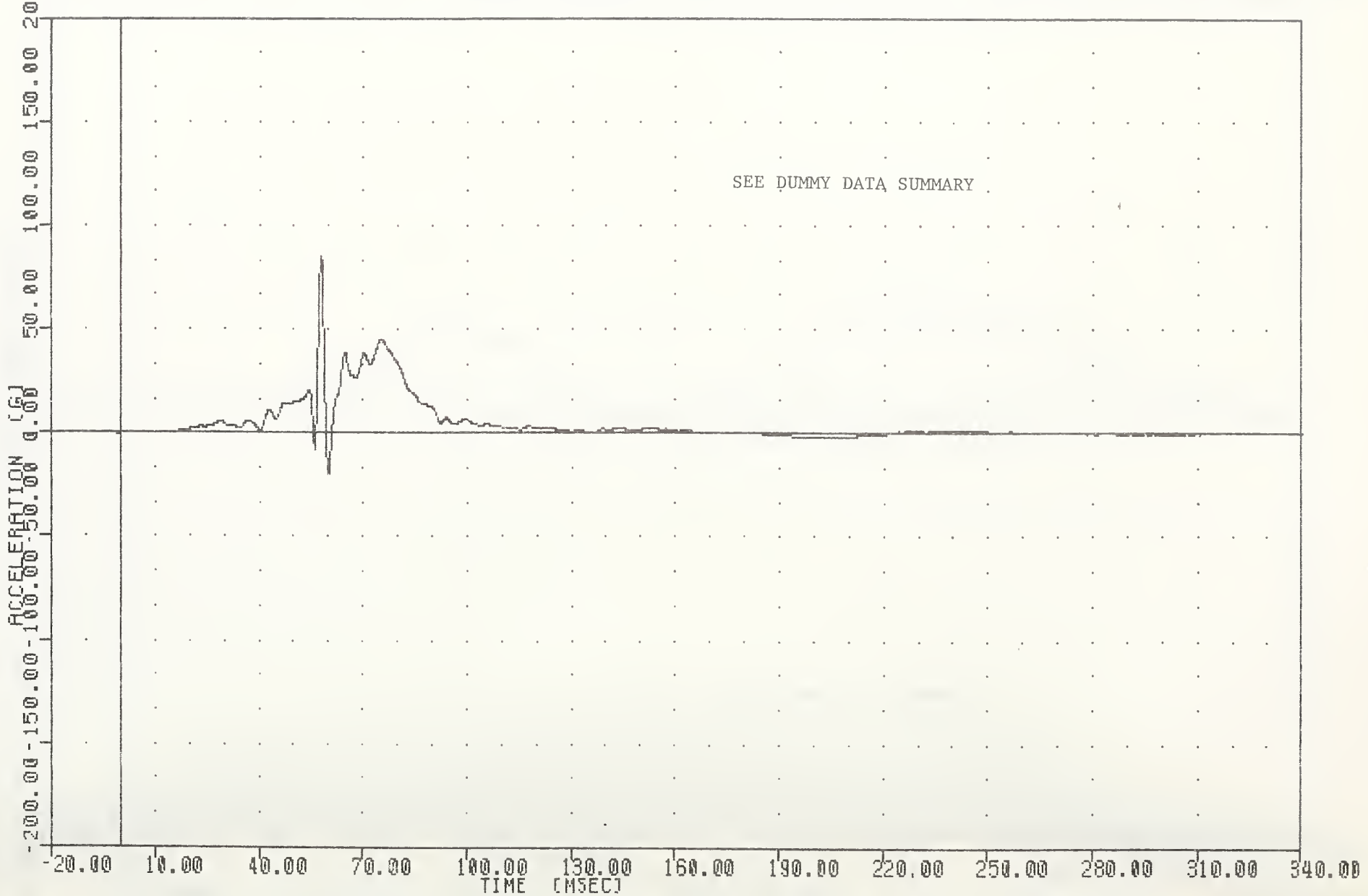


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

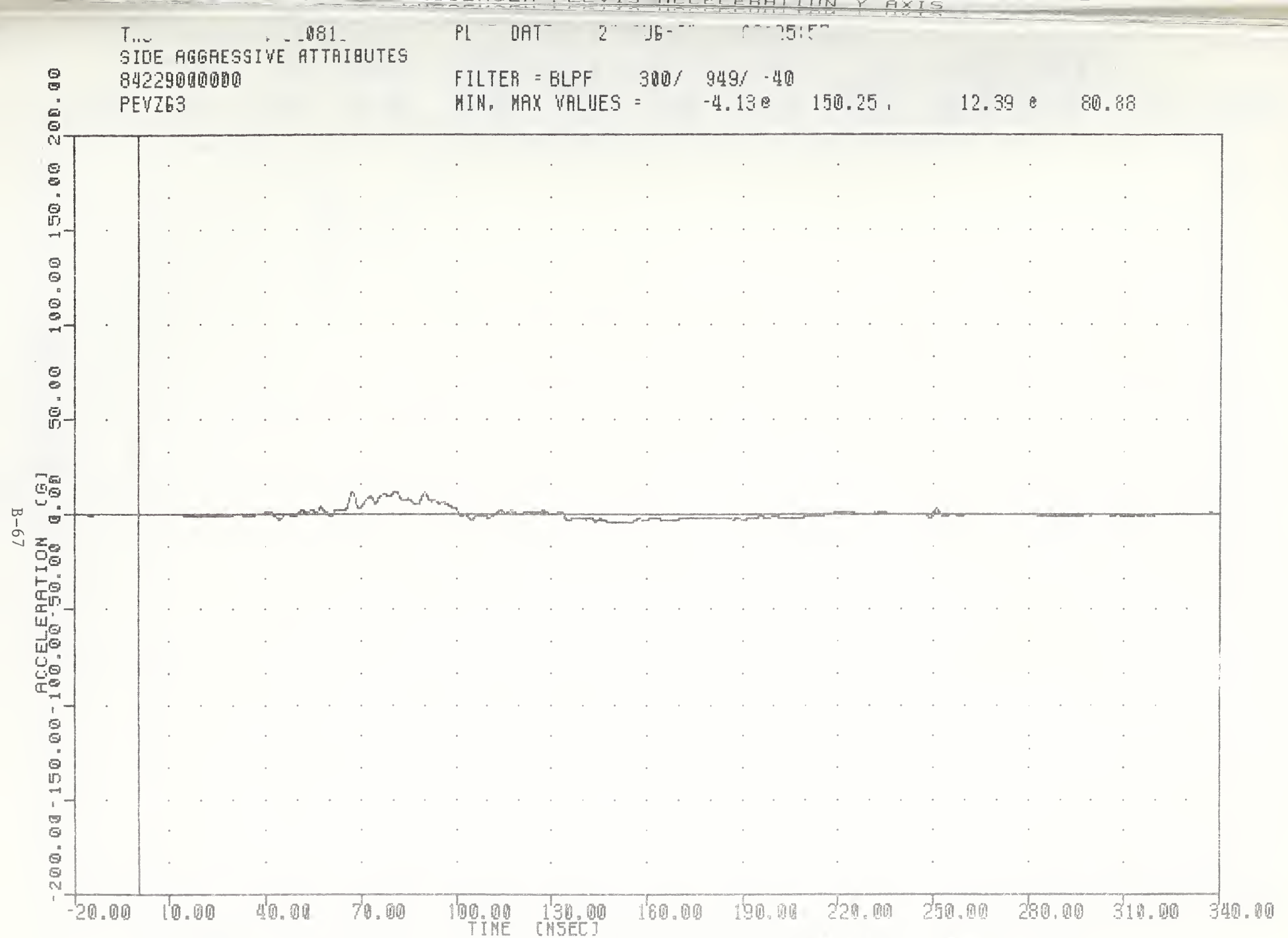


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER PELVIS ACCELERATION X AXIS

T... ...081... PL... DAT... 2... AUG-8... ...35:57
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 300/ 949/ -40
PEVYG3 MIN, MAX VALUES = -20.35 @ 59.88 , 85.53 @ 57.63



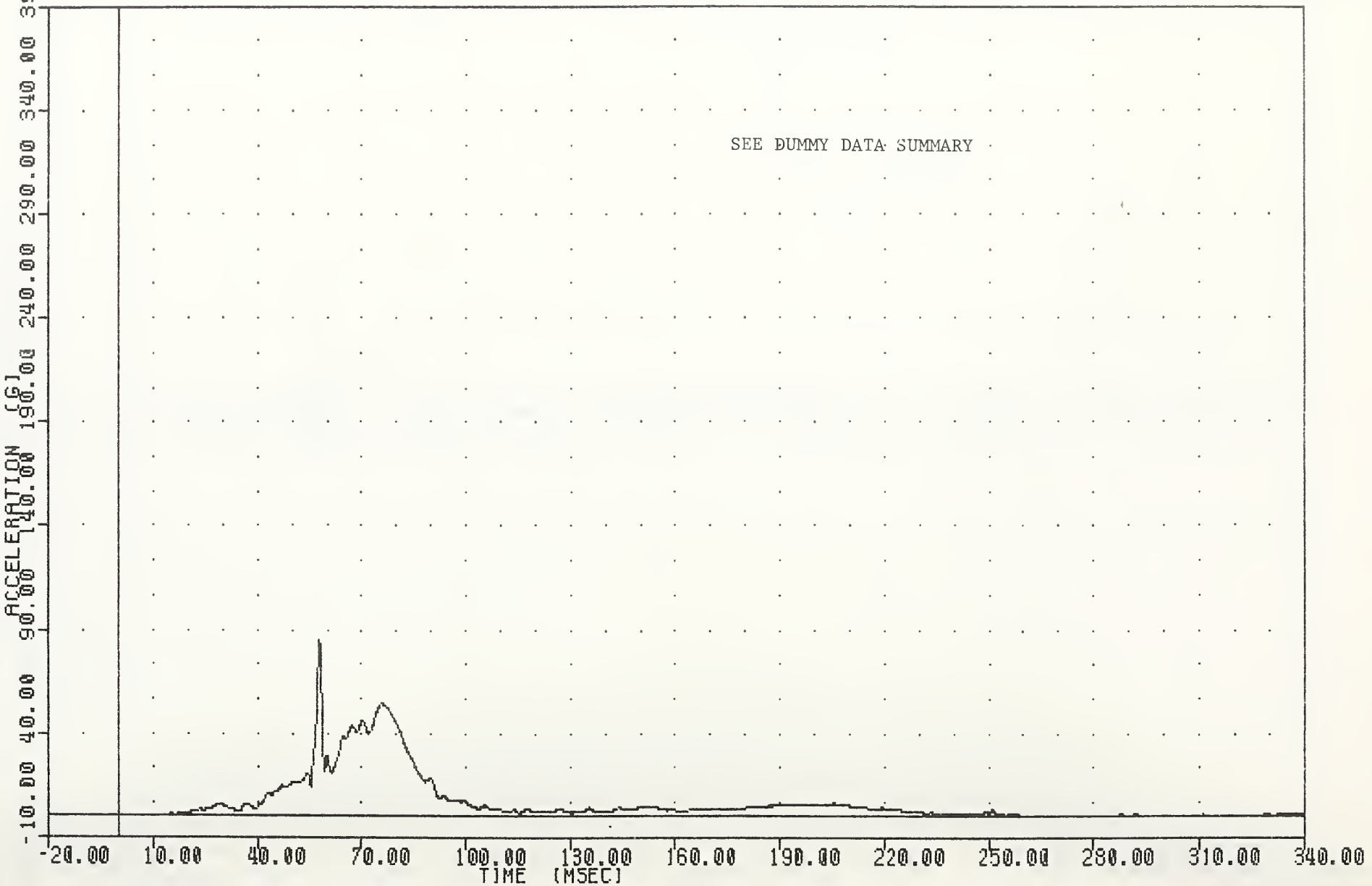
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER PELVIS ACCELERATION Y AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER PELVIS ACCELERATION Z AXIS

SIDE AGGRESSIVE ATTRIBUTES
842290000000
PEVRG3

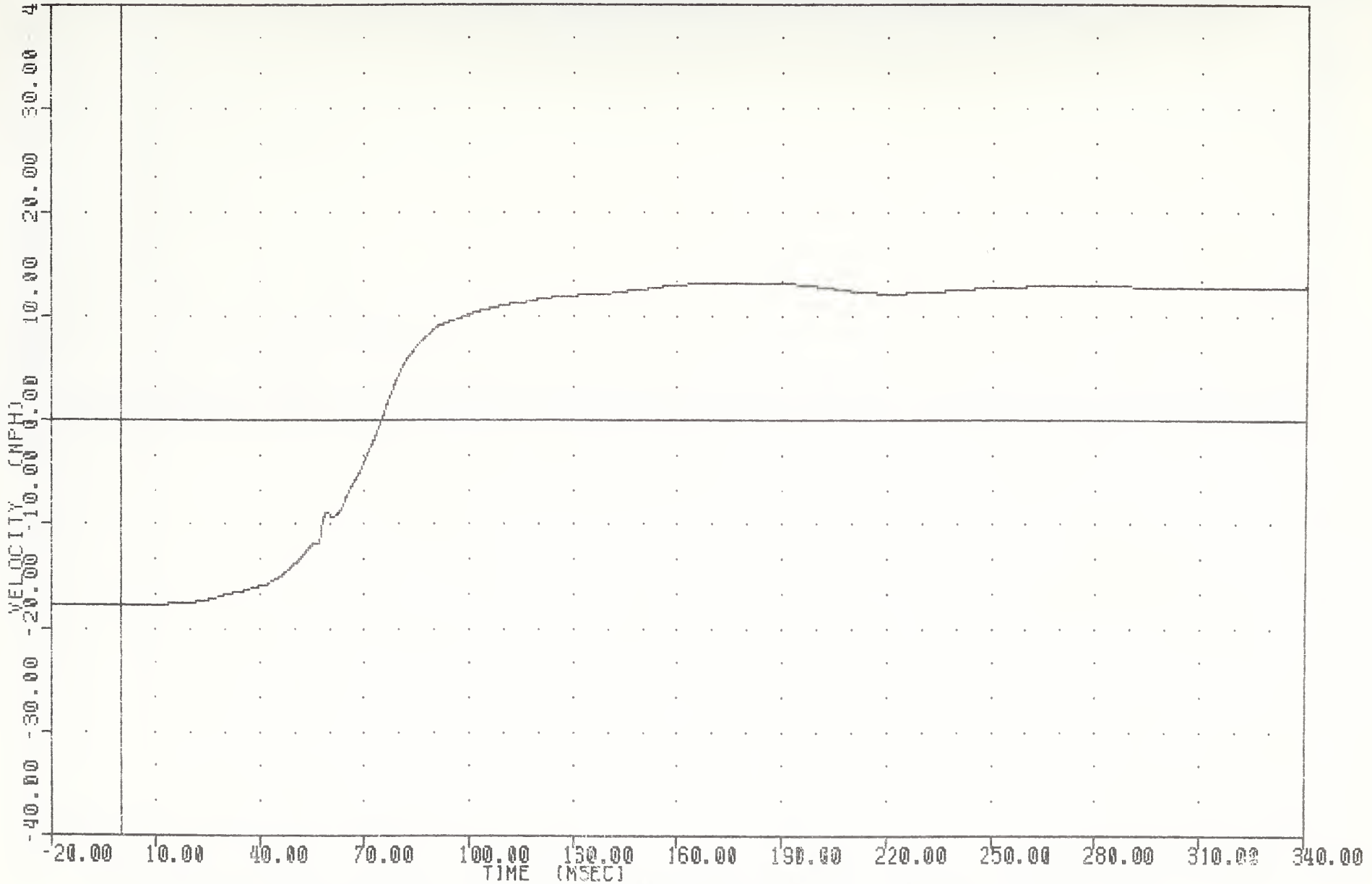
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = 0.03 @ 10.38 , 85.60 @ 57.63



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
PASSENGER PELVIS RESULTANT

SIDE AGGRESSIVE ATTRIBUTES
34229@@@@@@
PEVYV3

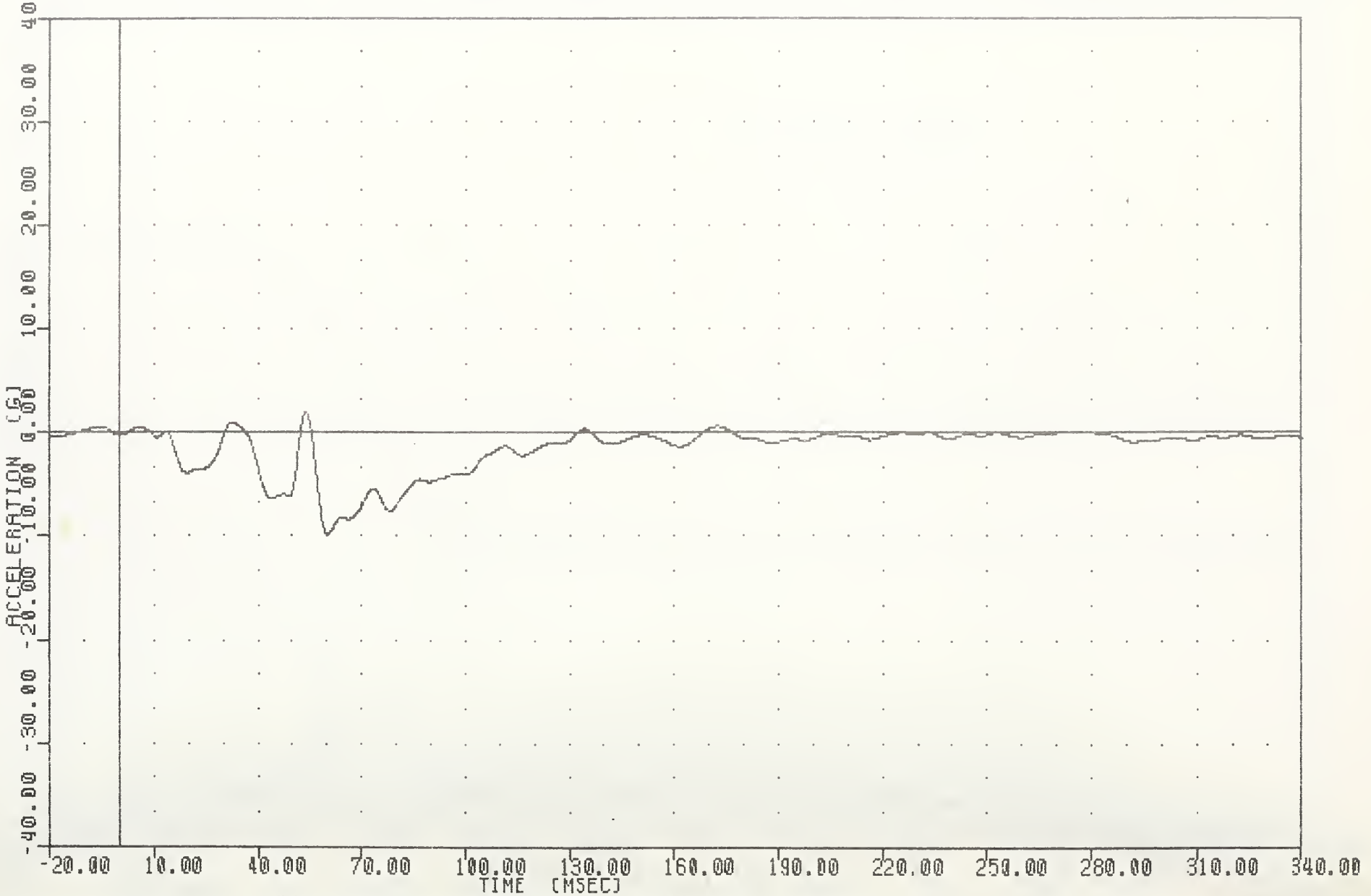
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -17.70 -20.00 , 13.24 184.25



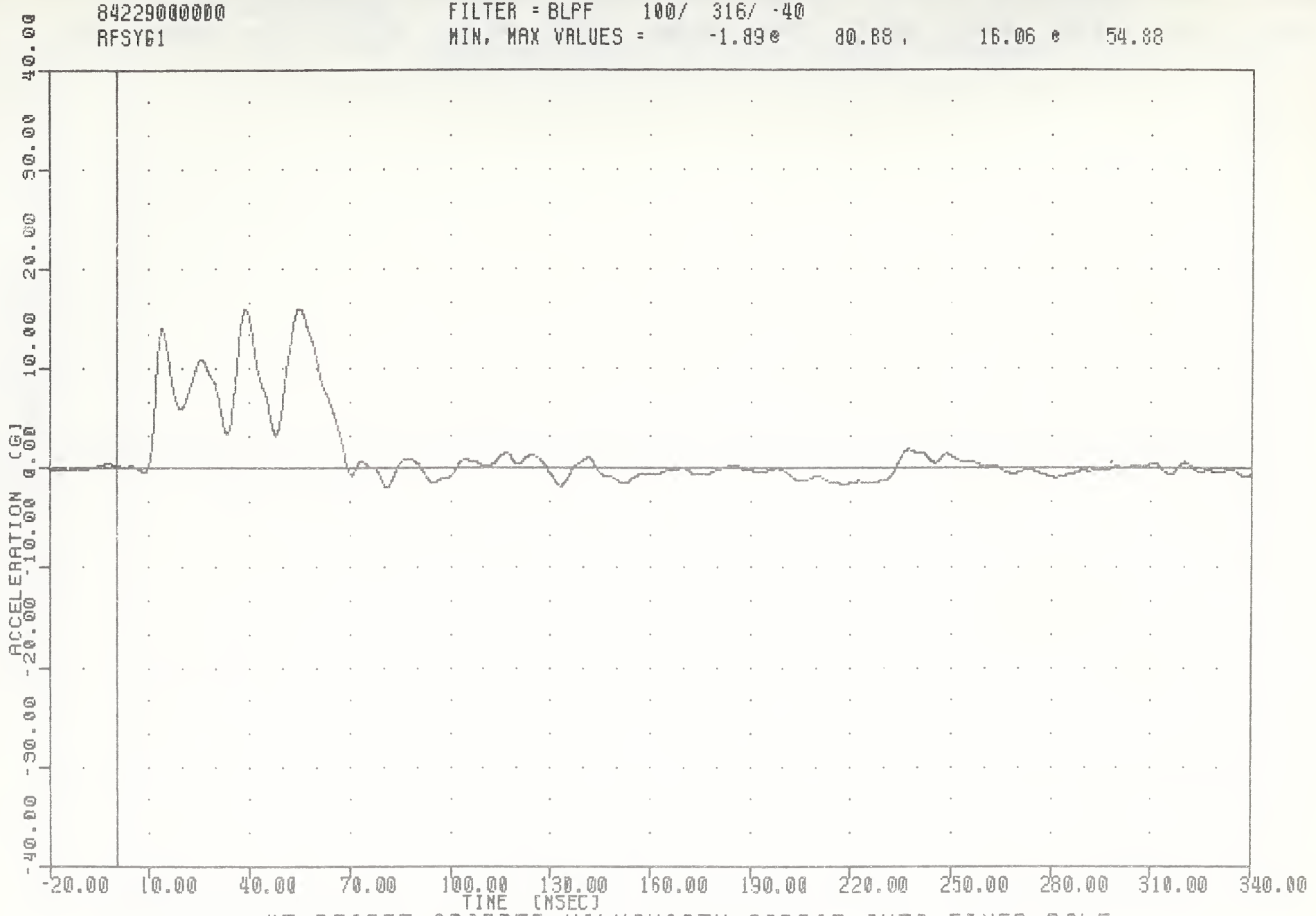
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DEL R V USING PEVYG3

SIDE AGGRESSIVE ATTRIBUTES
84229000000
RFSXG1

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -9.87 @ 60.00 , 2.06 @ 53.75

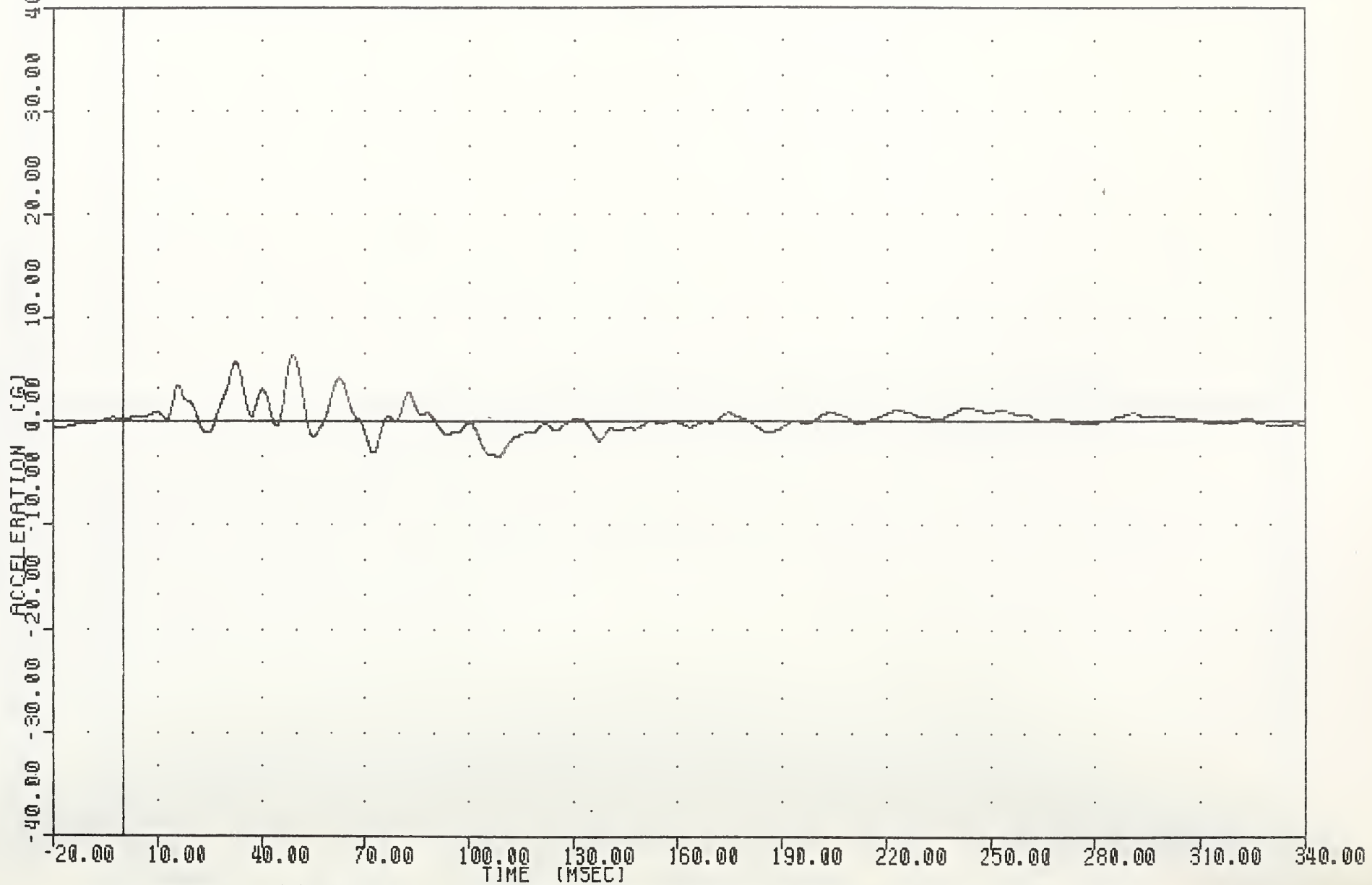


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

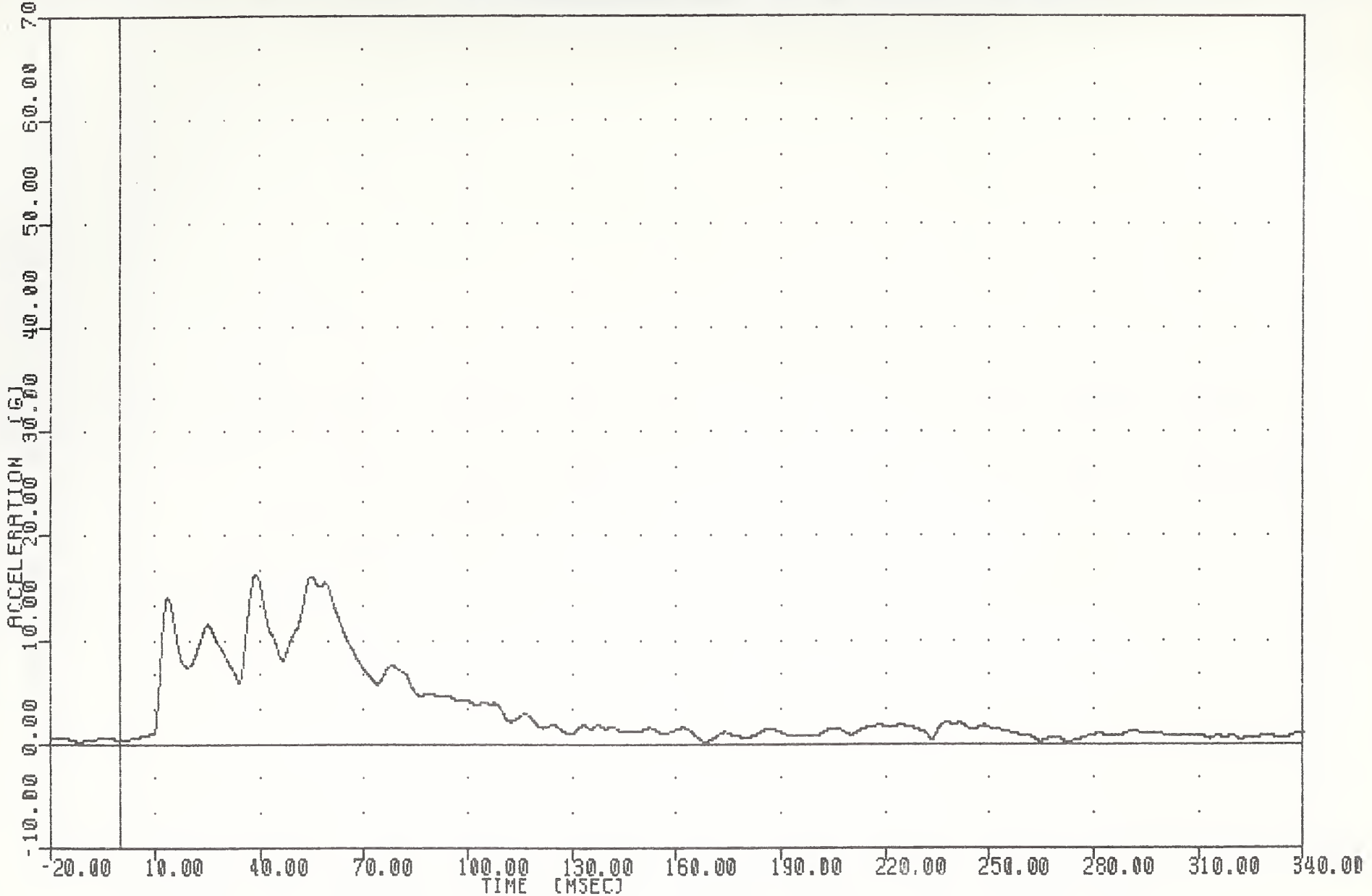
TRC , 840816 PLOT DATE 24-AUG-84 08:25:57
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 100/ 316/ -40
RFSZG1 MIN, MAX VALUES = -3.35 @ 108.13 , 6.47 @ 48.88



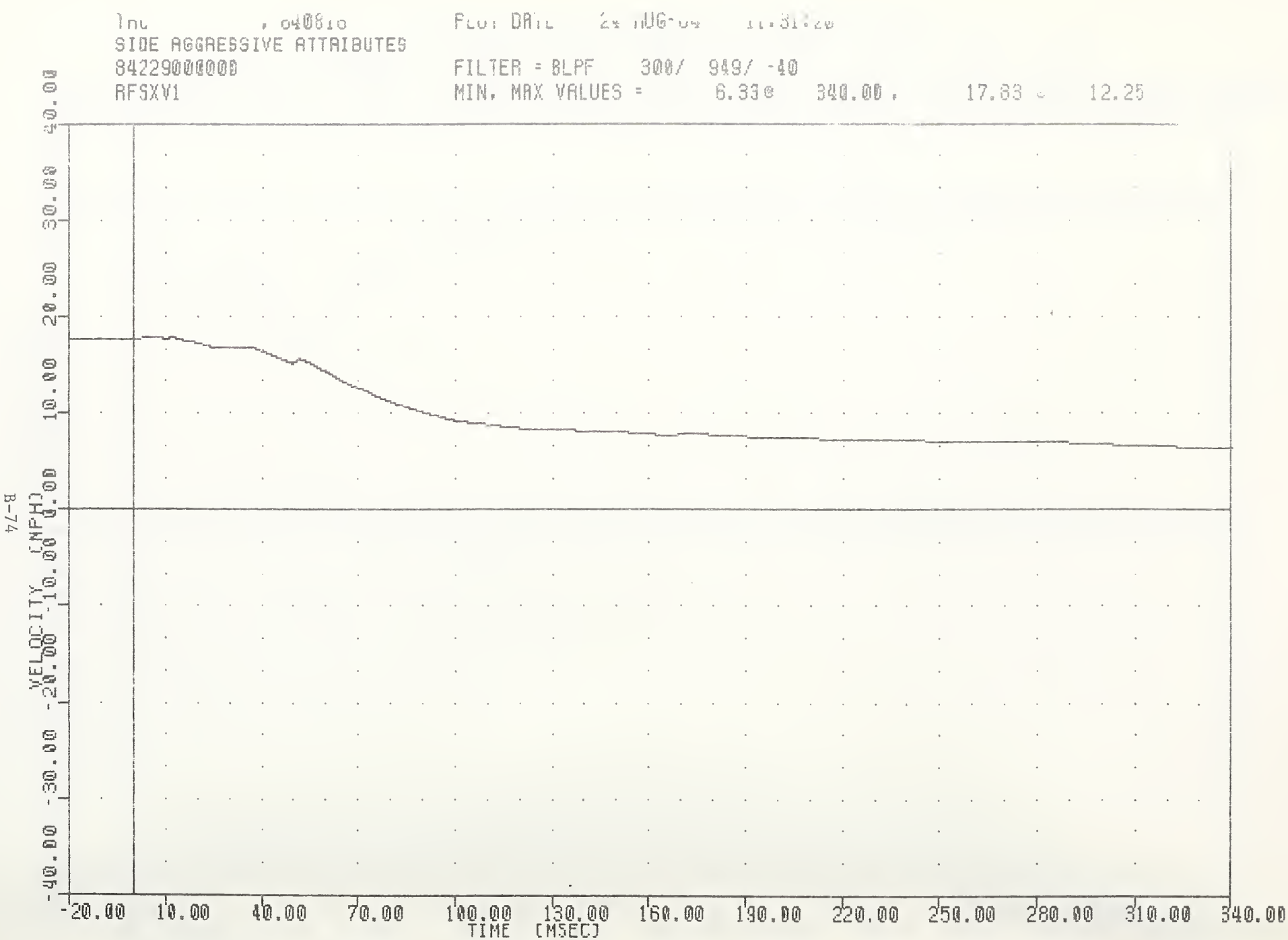
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS

PLOT DATE 24-AUG-84 08:27:05

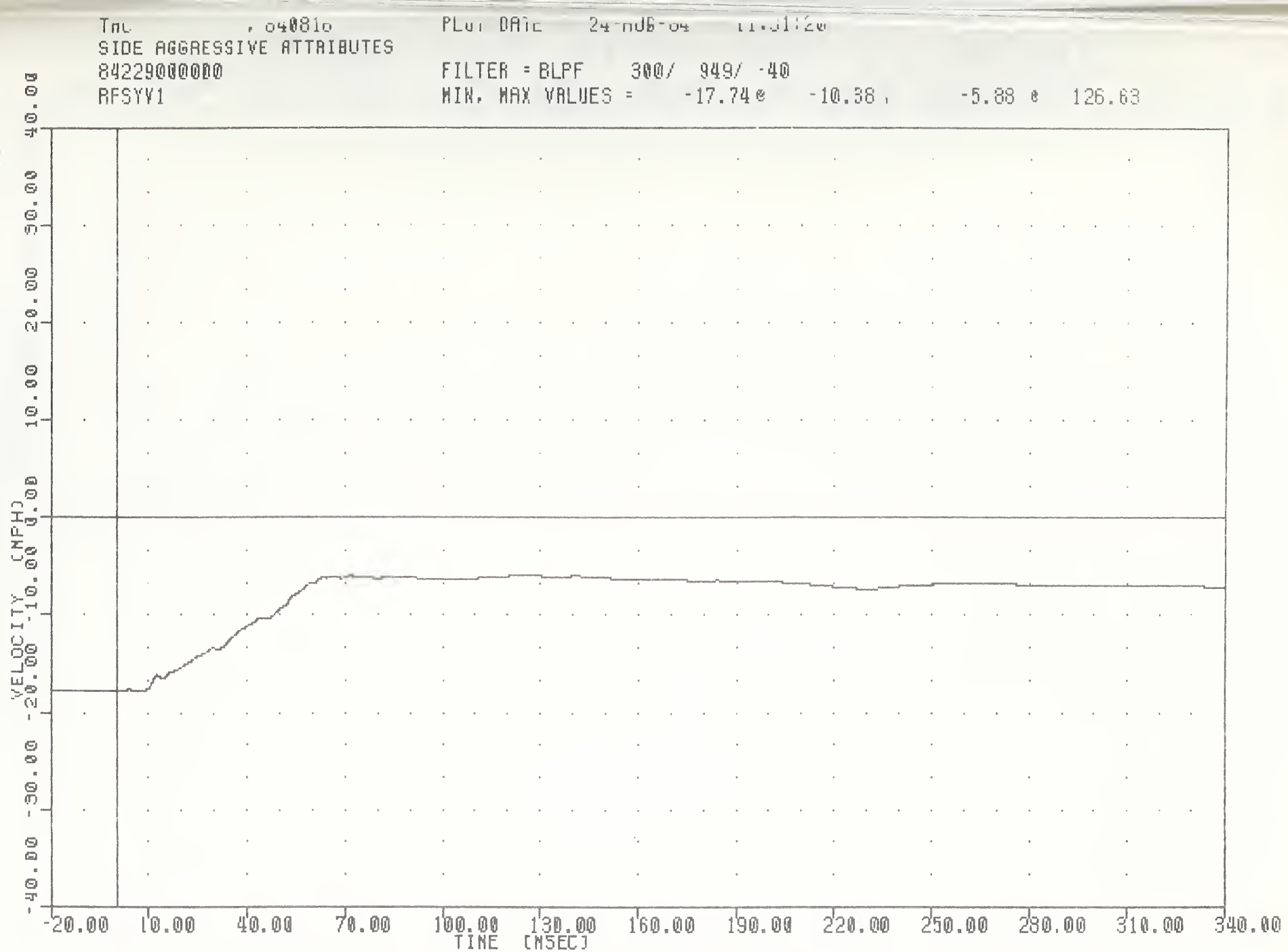
TRL , 840816 PLOT DATE 24-AUG-84 08:27:03
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 100/ 316/ -40
RFSRG1 MIN, MAX VALUES = 0.12 @ 168.25 , 16.26 @ 38.88



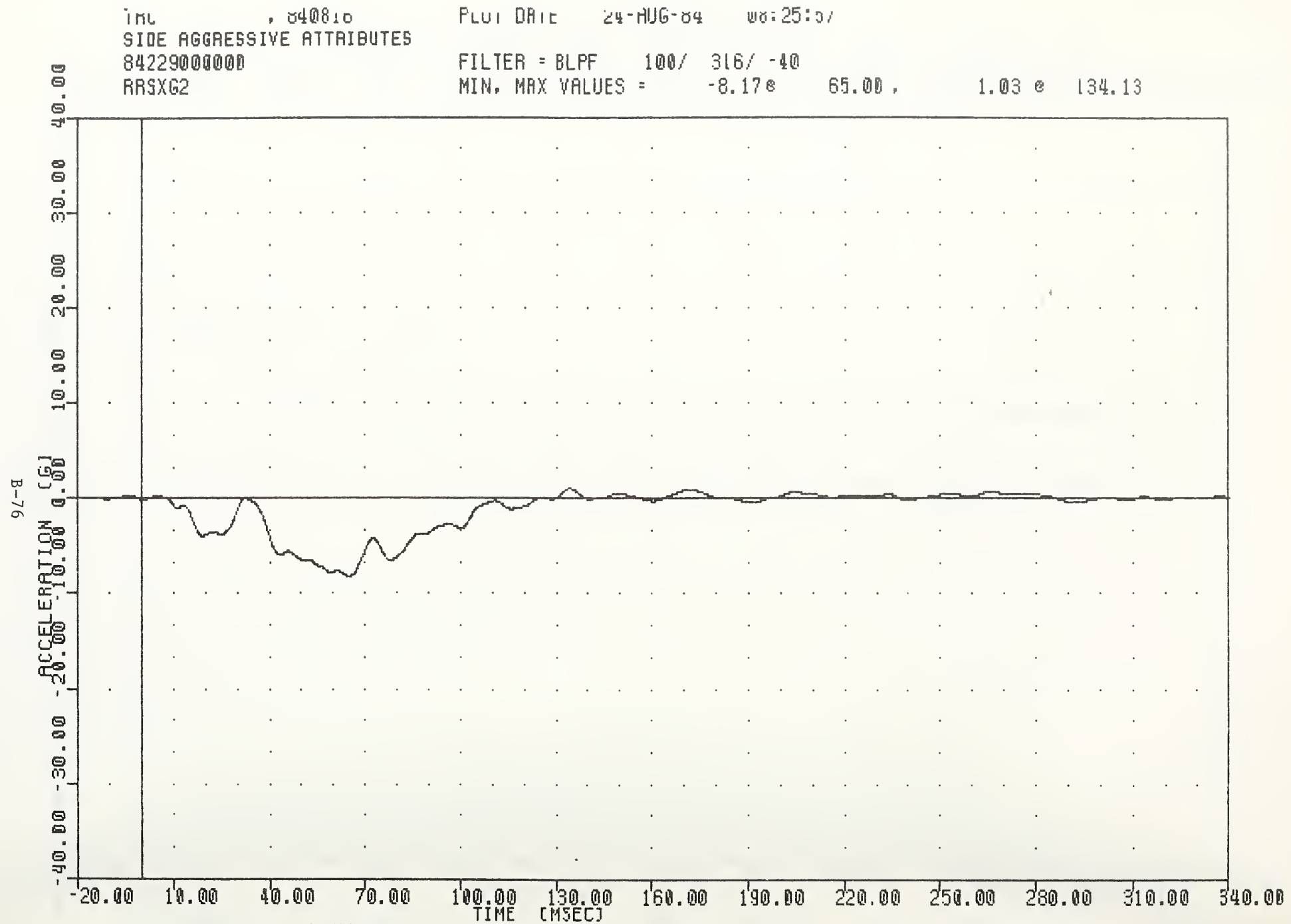
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT FRONT SILL RESULTANT



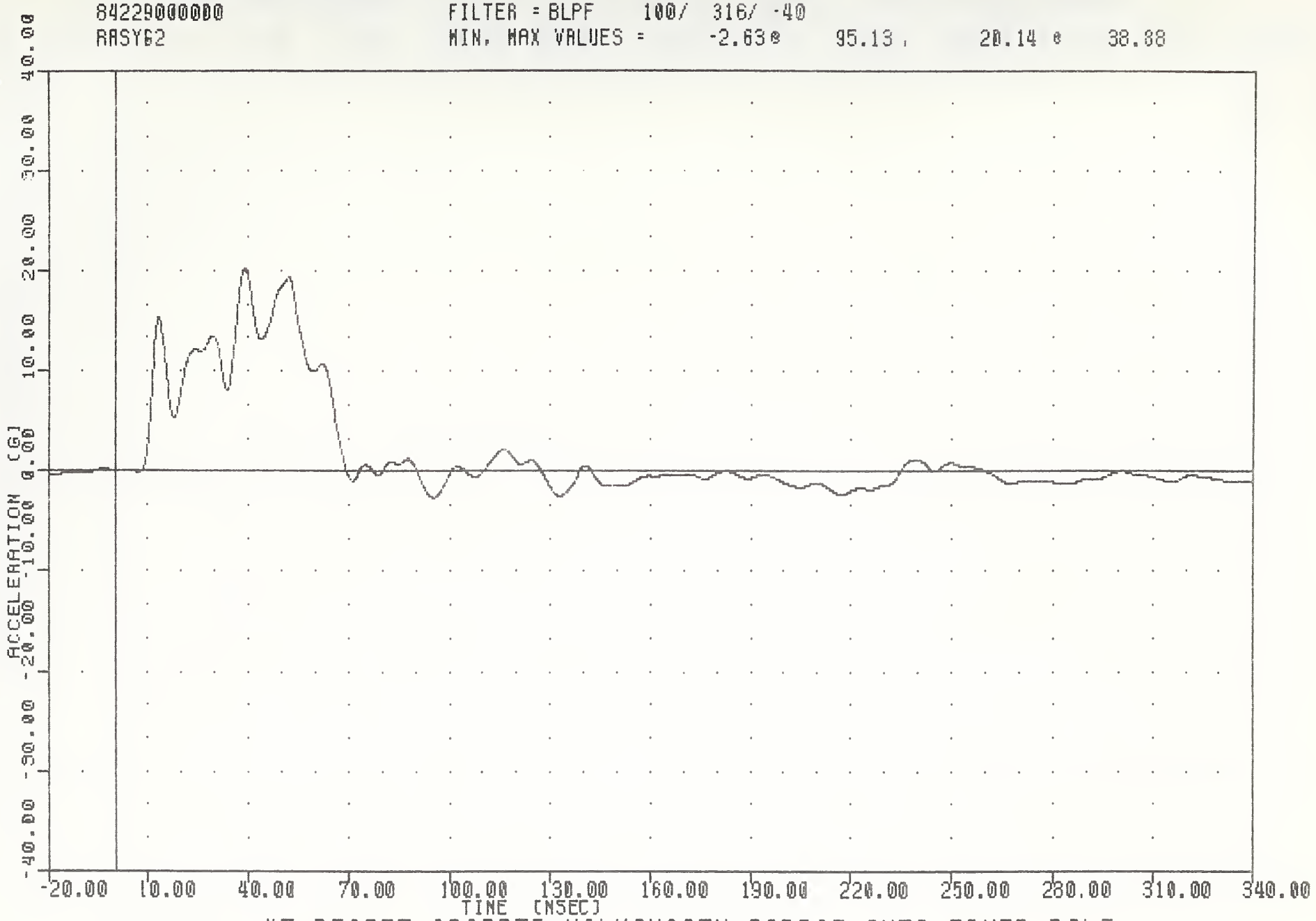
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RFSXG1



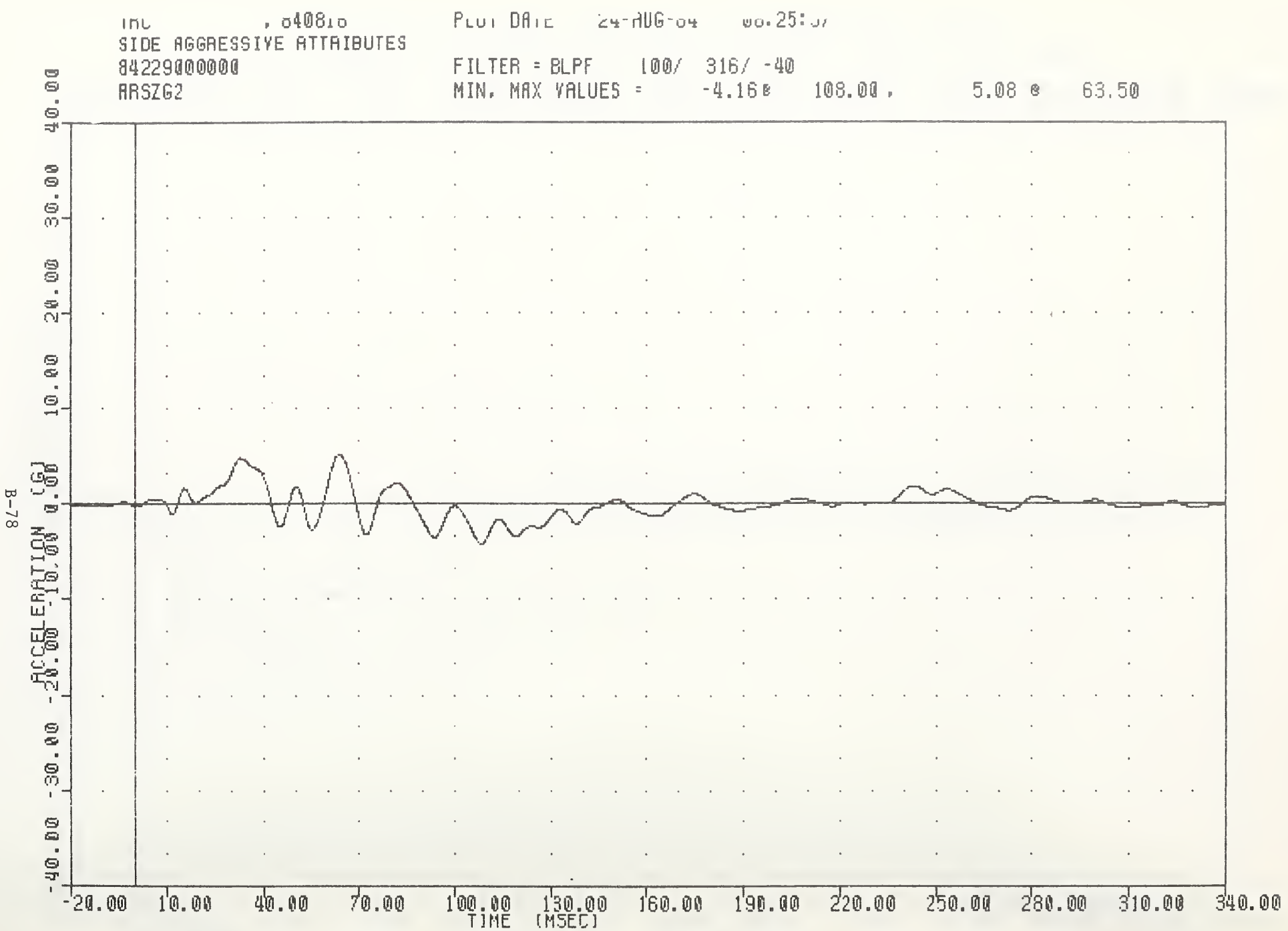
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RFSYG1



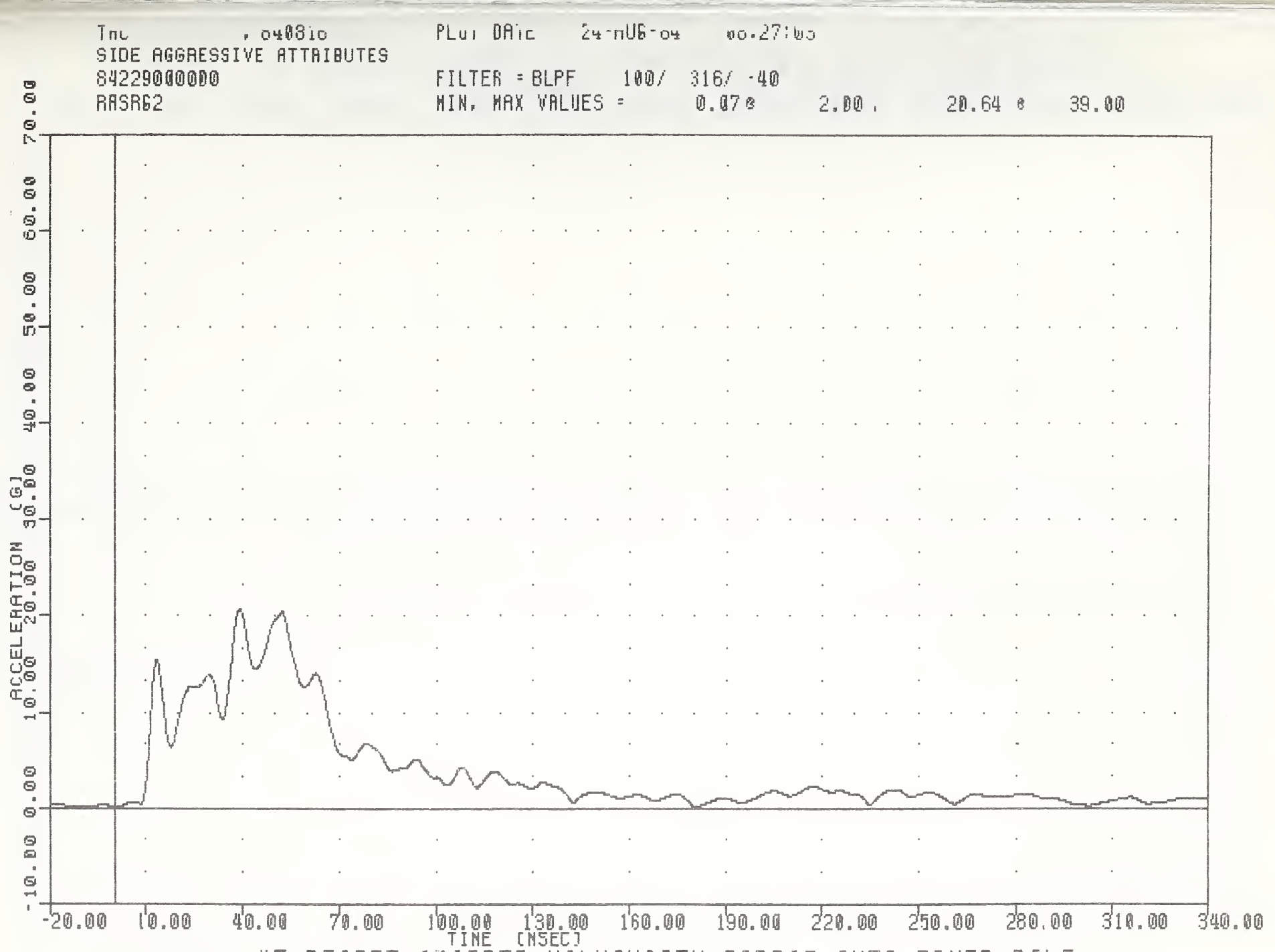
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT REAR SILL ACCELERATION X AXIS



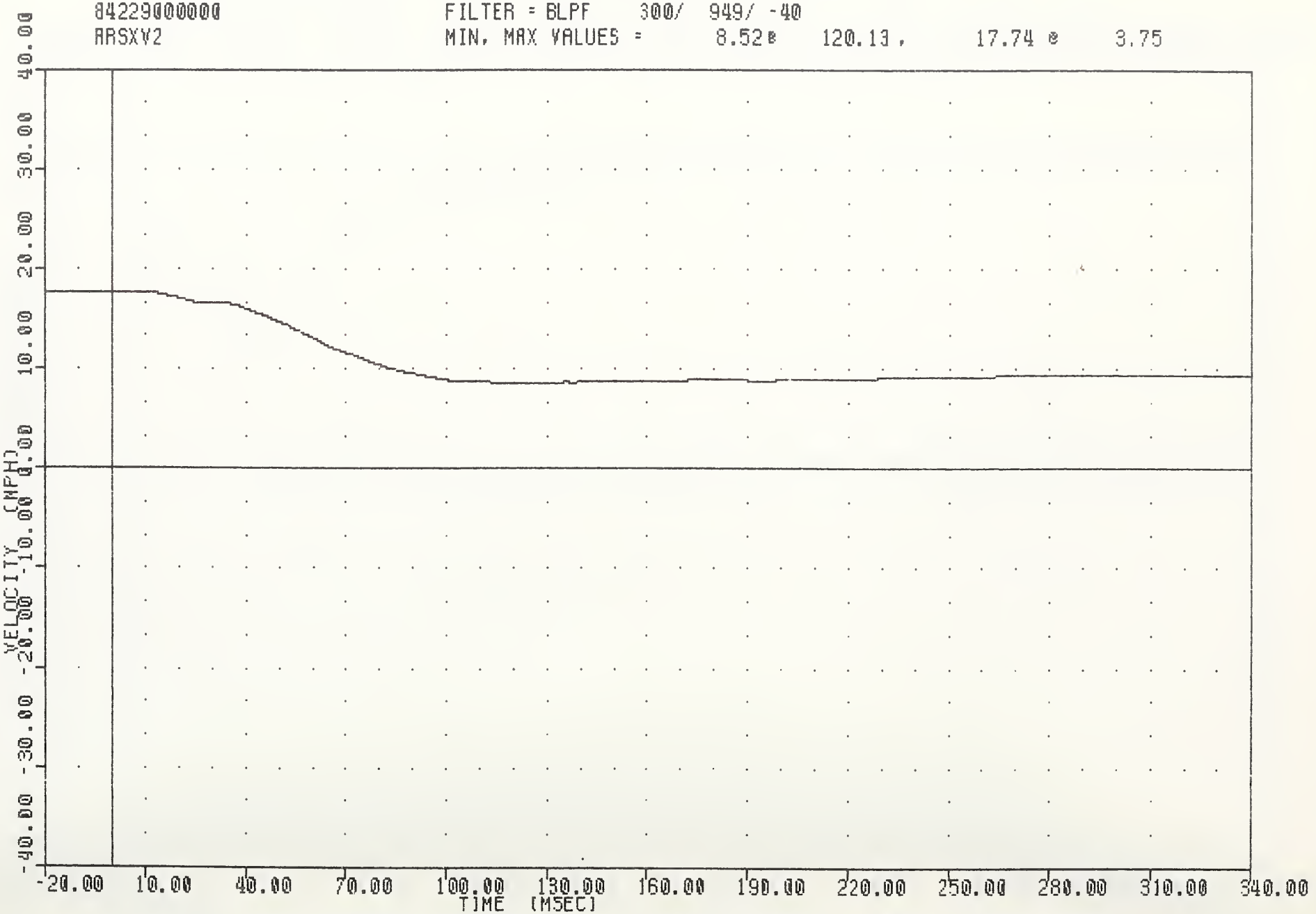
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS

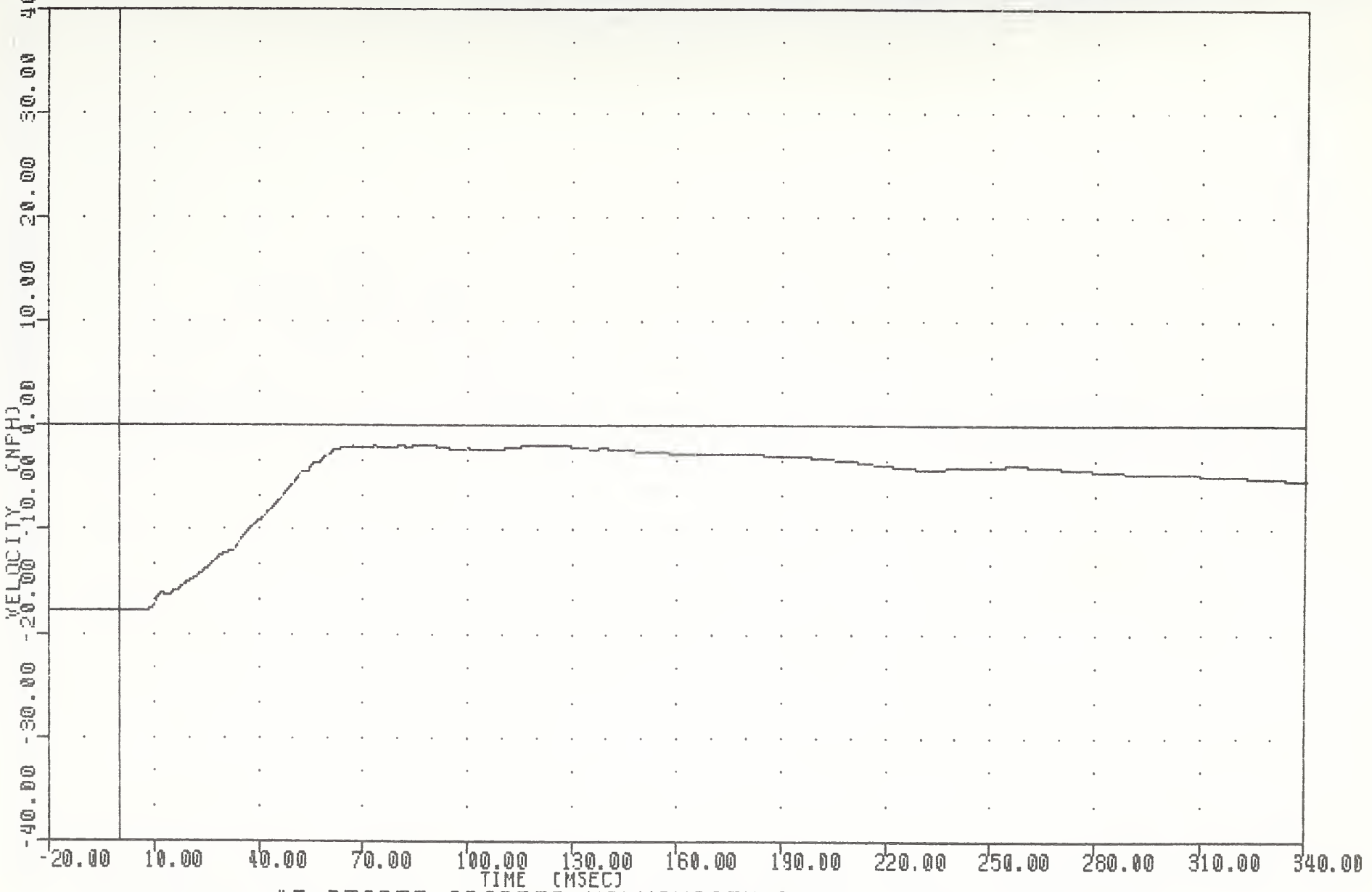


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE RIGHT REAR SILL RESULTANT

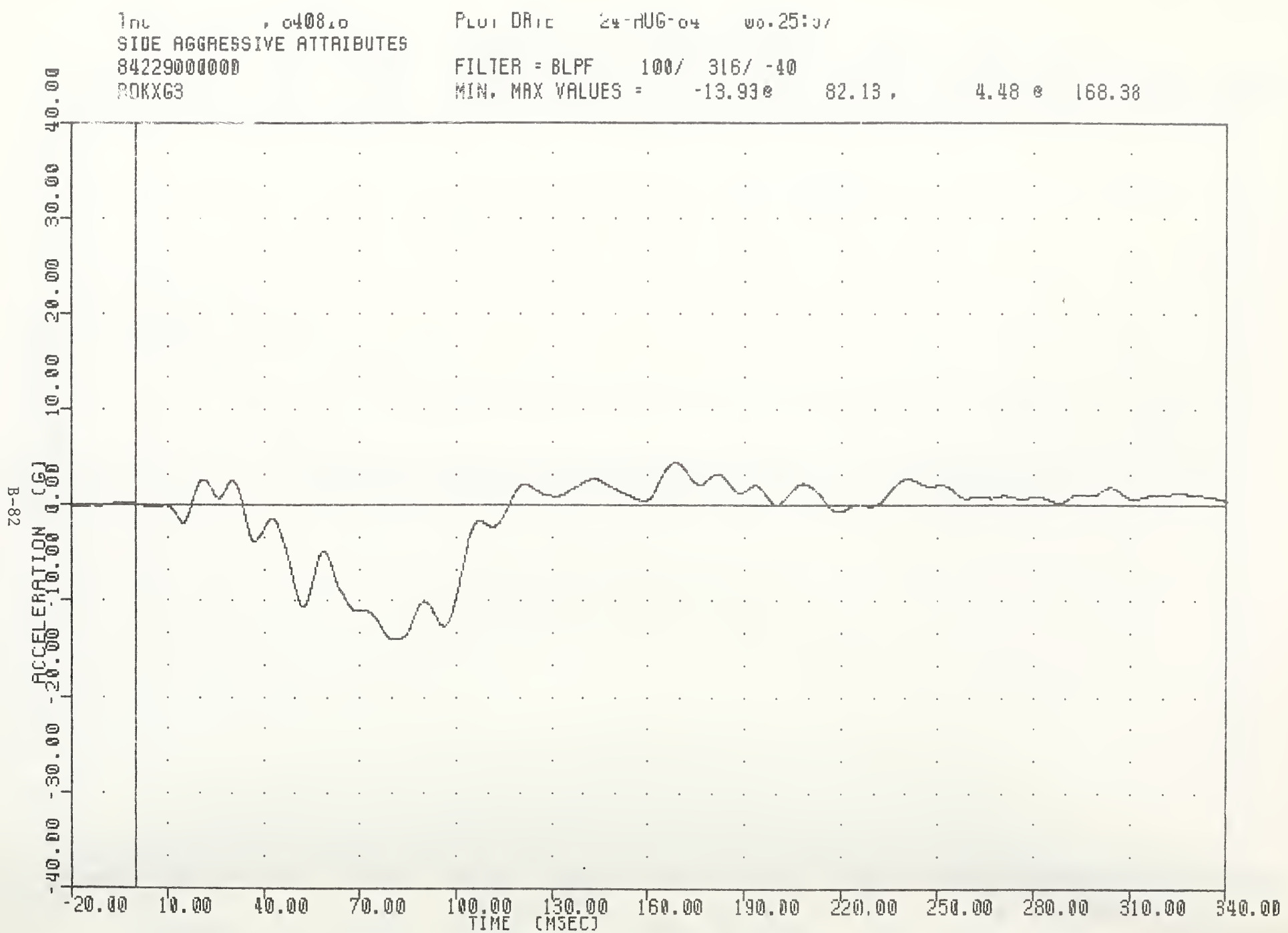


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RRSXG2

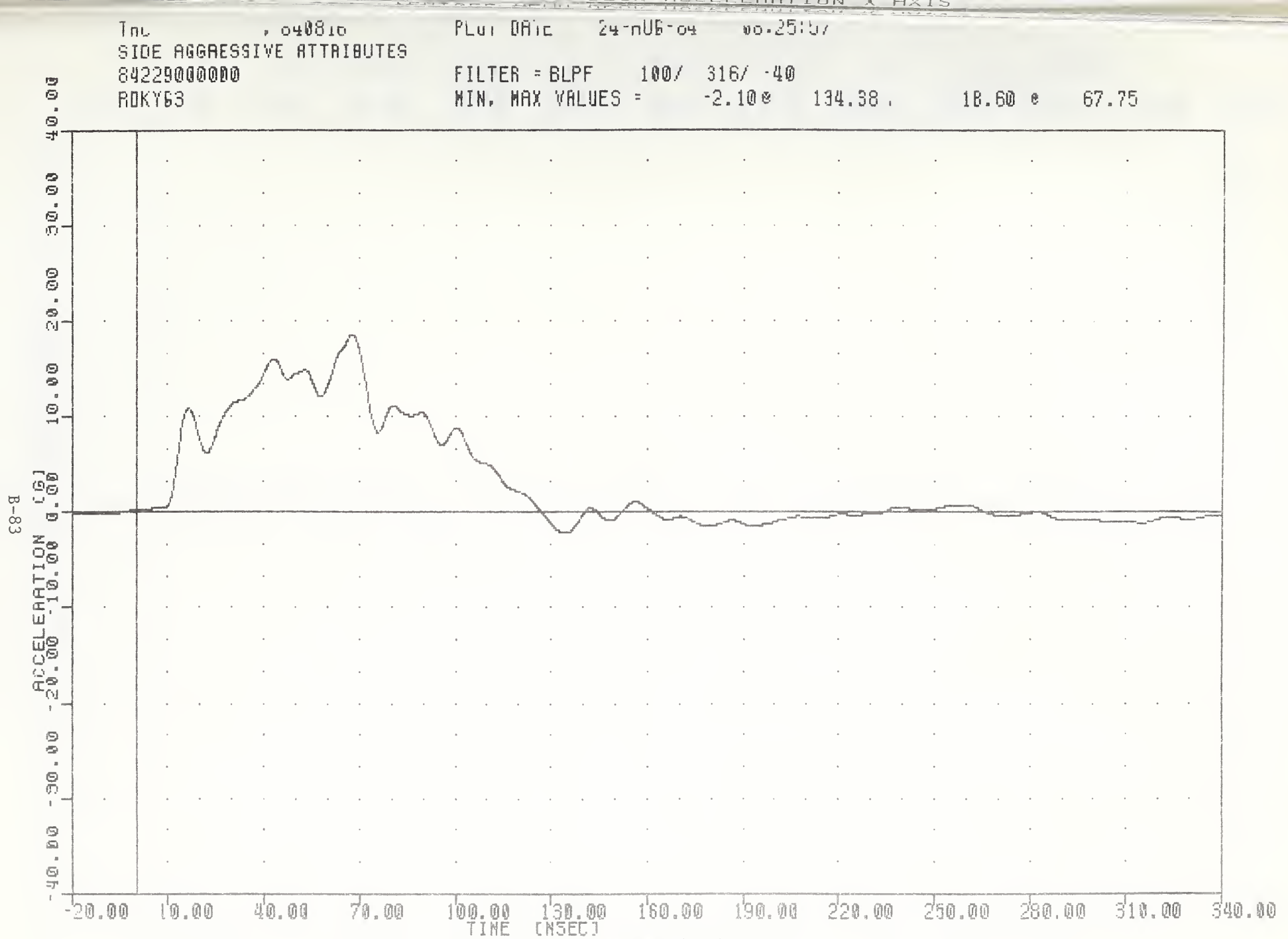
Inc , 040810 PLOT DATE 24-AUG-84 11:31:28
SIDE AGGRESSIVE ATTAIBUTES
84229000000 FILTER = BLPF 300/ 949/ -40
RRSYV2 MIN, MAX VALUES = -17.73@ -10.00 , -1.80 @ 124.00



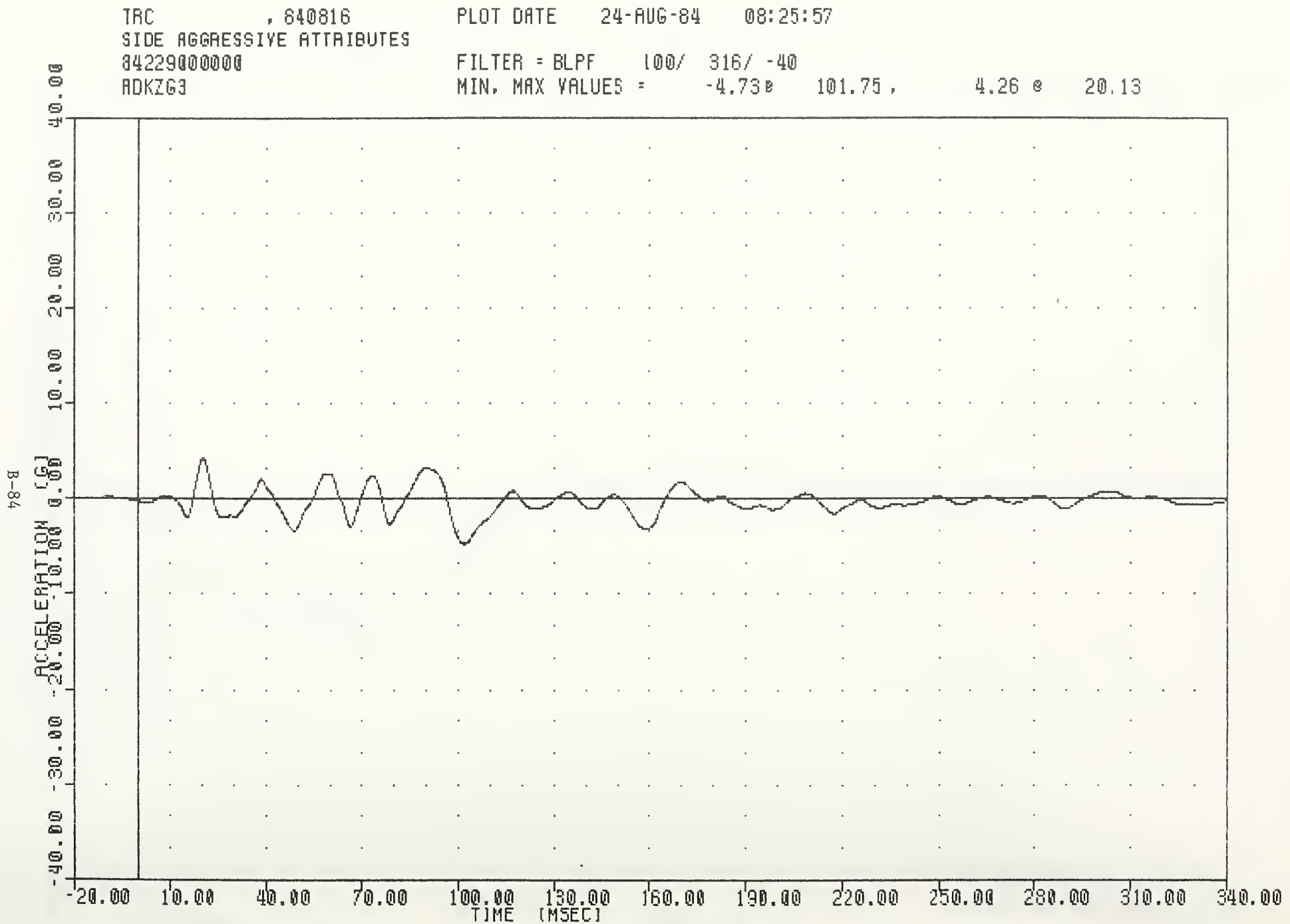
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RRSYG2



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE REAR DECK ACCELERATION X AXIS



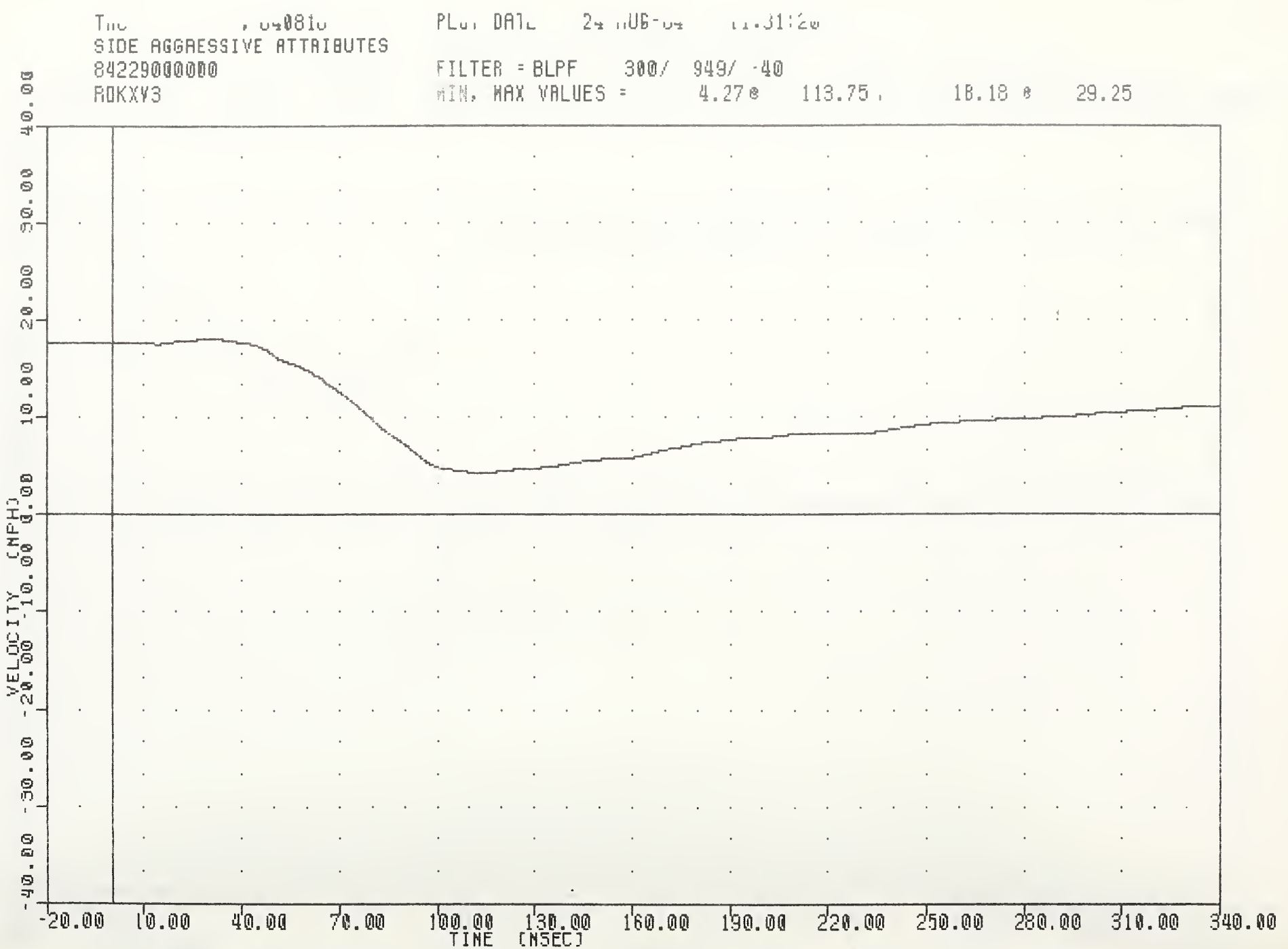
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE REAR DECK ACCELERATION Y AXIS



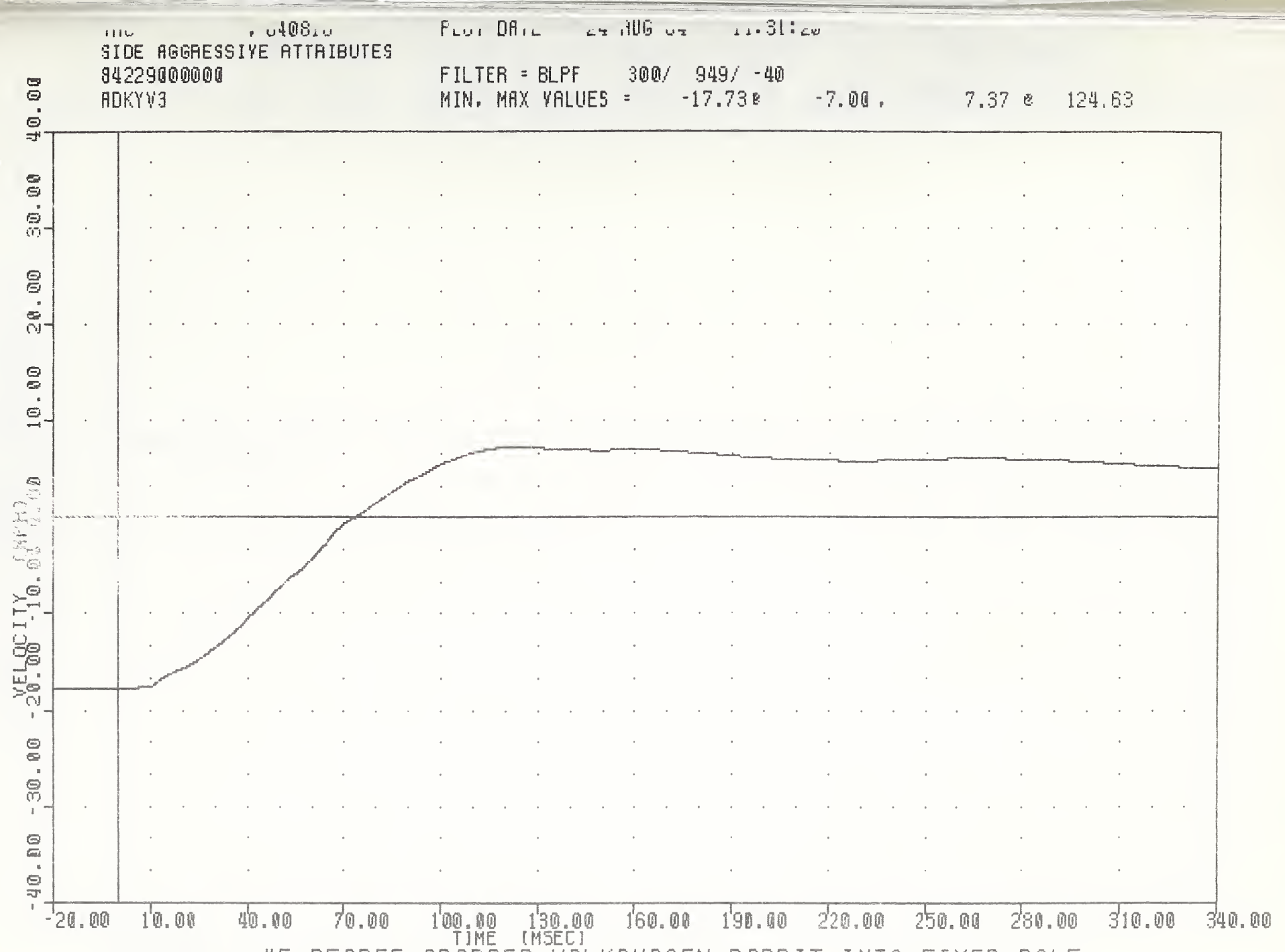
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE REAR DECK ACCELERATION Z AXIS

TRC , 840816 PLOT DATE 24-AUG-84 08:27:03
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 100/ 316/ -40
RDKRG3 MIN, MAX VALUES = 0.11 @ -15.50 , 21.65 @ 67.75

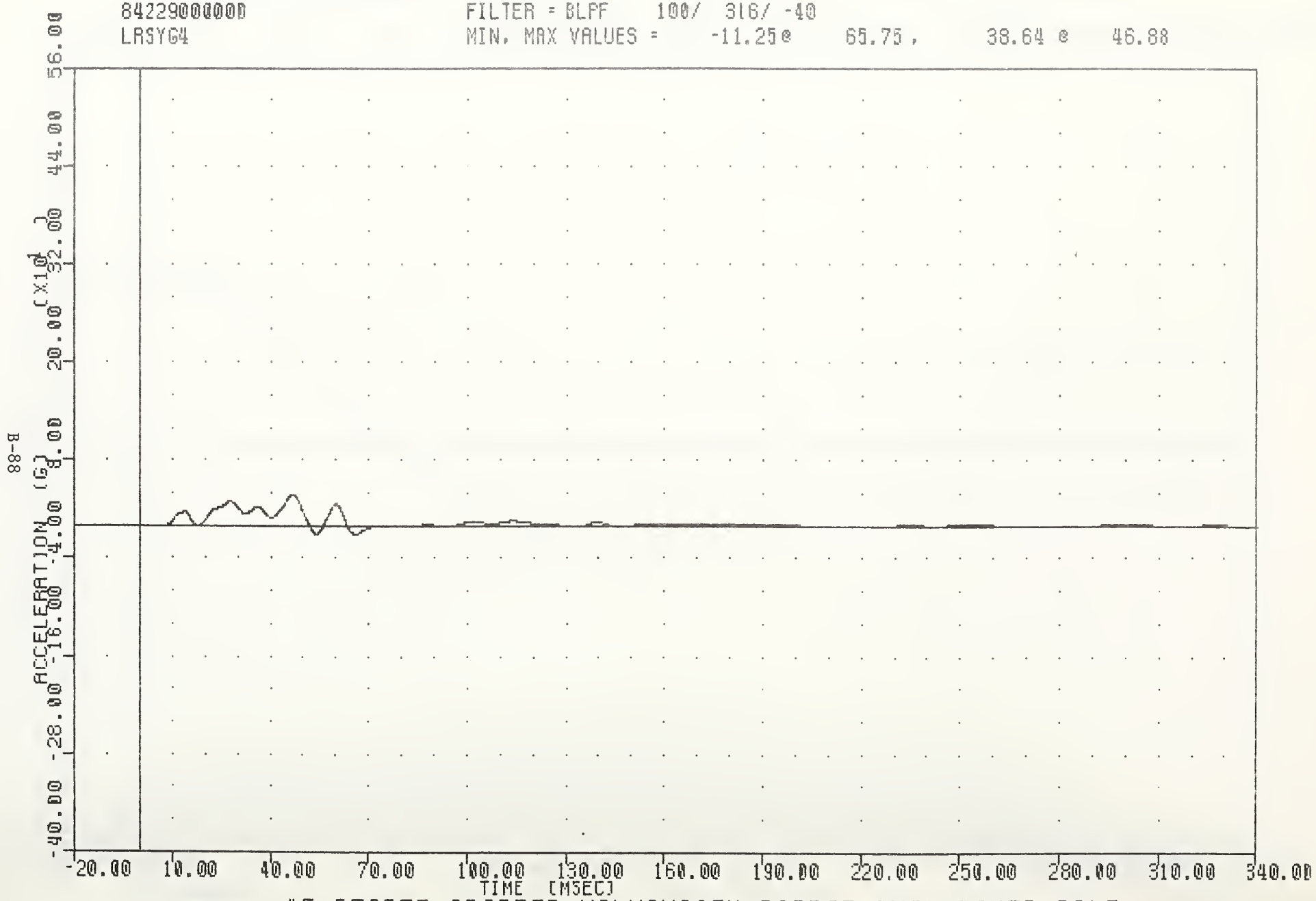
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE REAR DECK RESULTANT



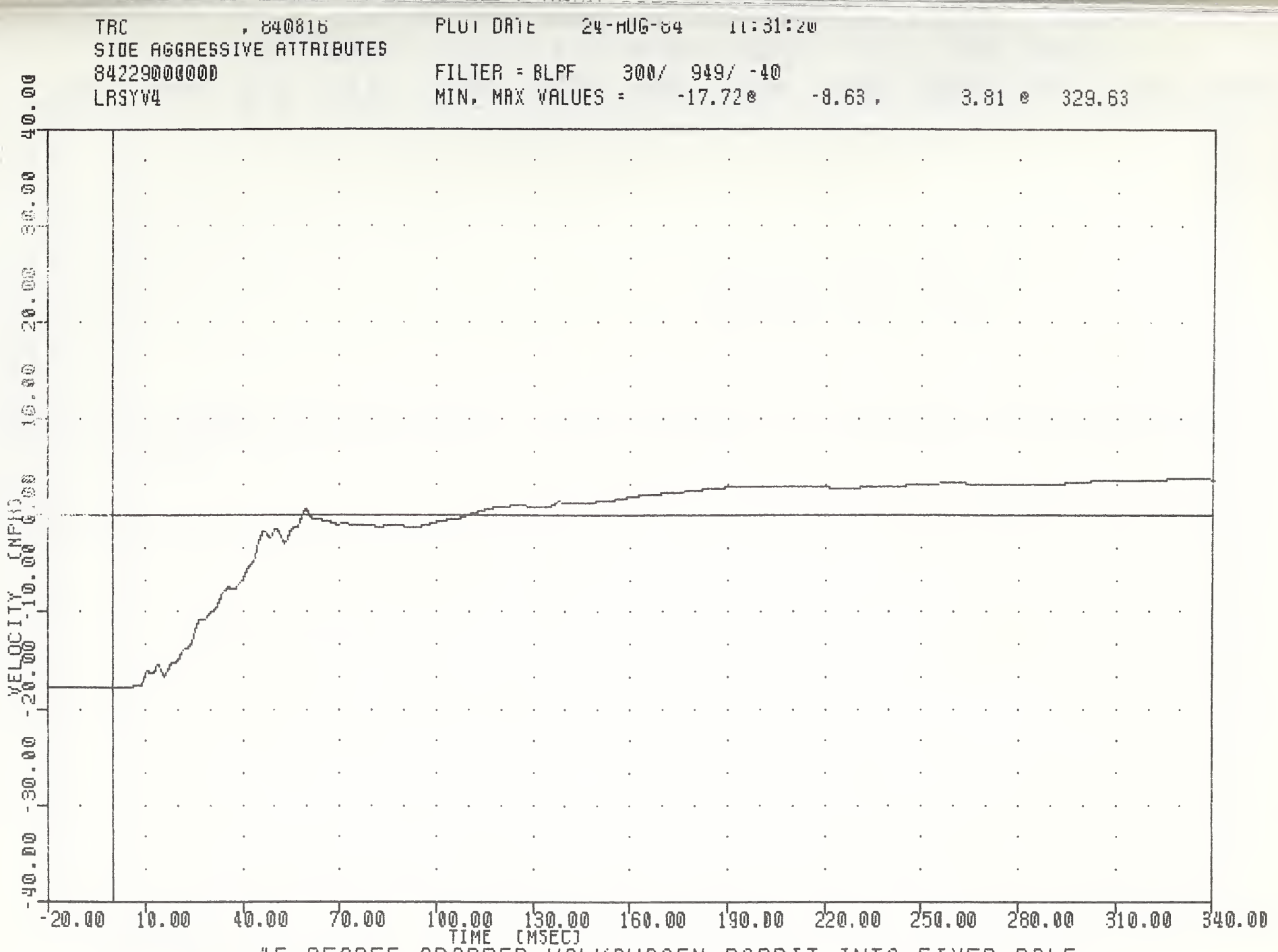
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RDKXG3



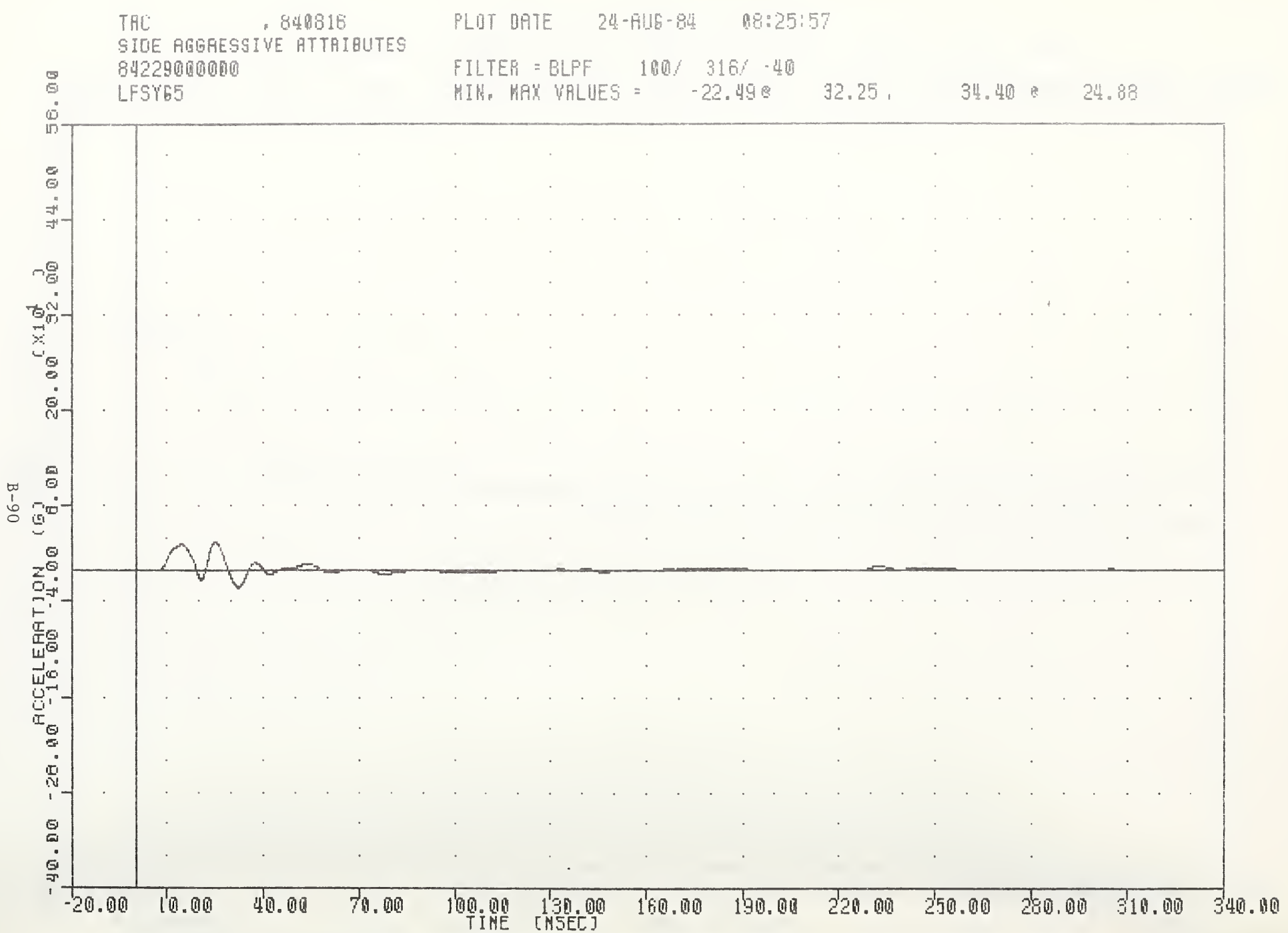
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING RDKYG3



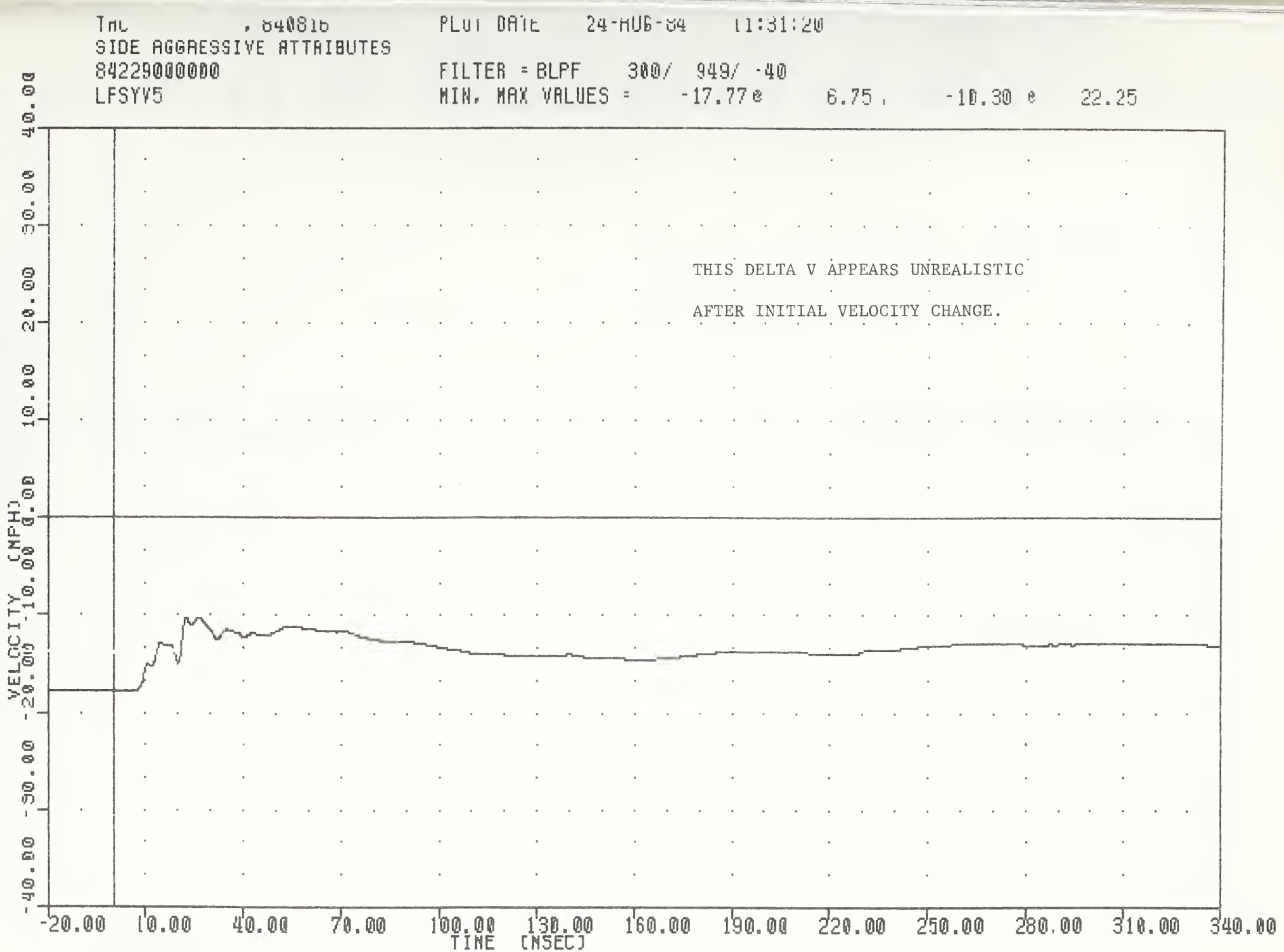
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT REAR SILL ACCELERATION Y AXIS



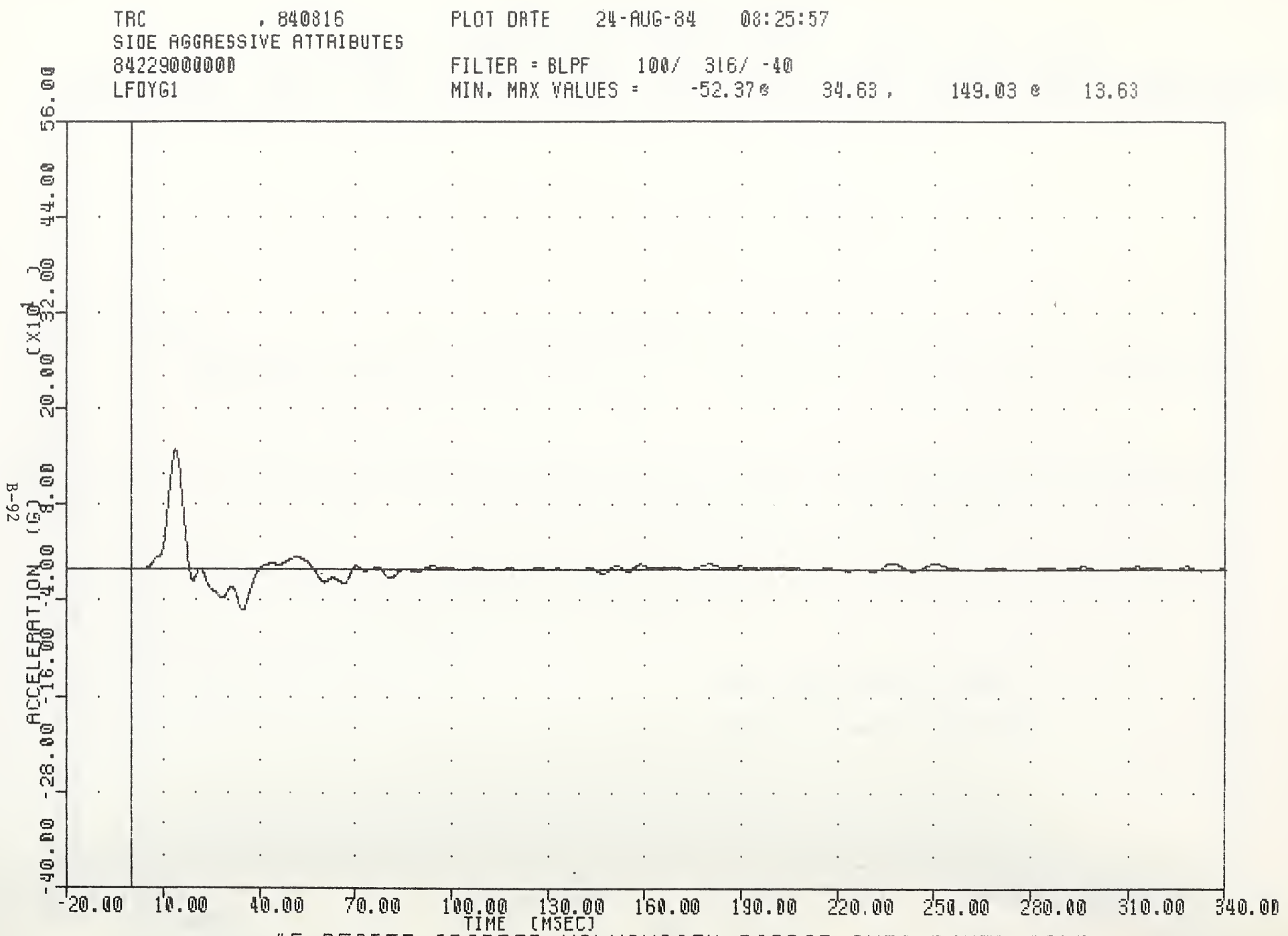
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LRSYG4



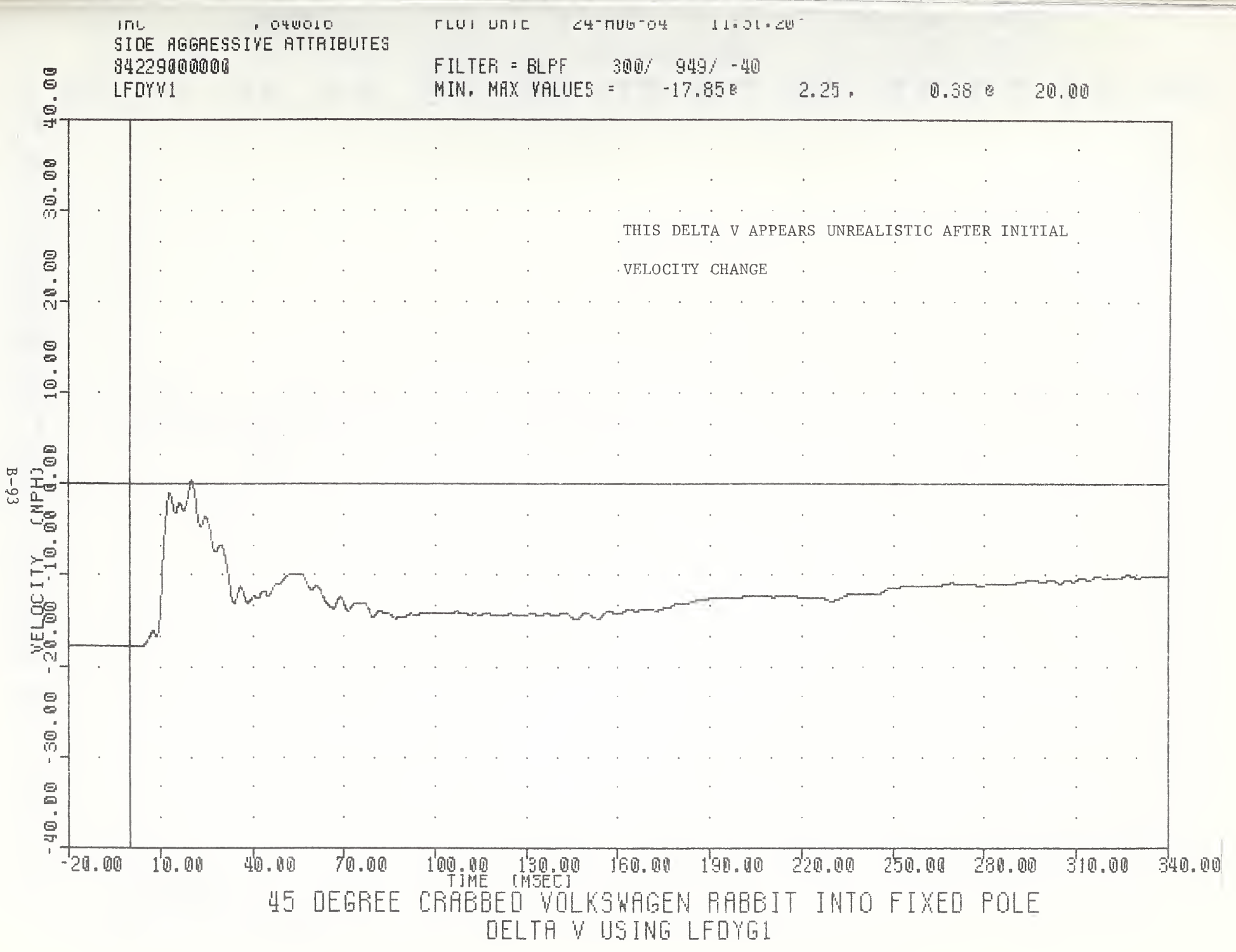
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS



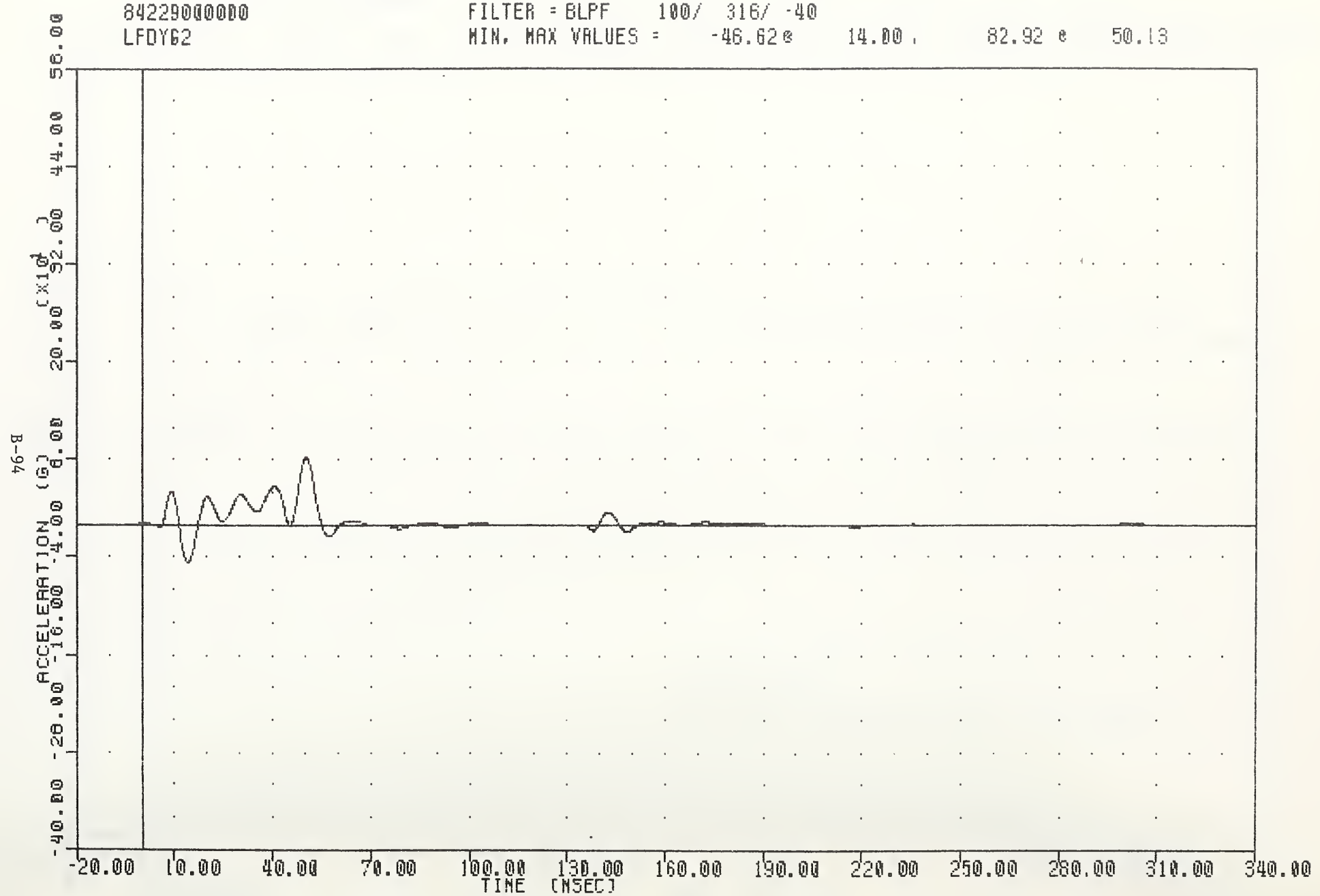
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFSYG5



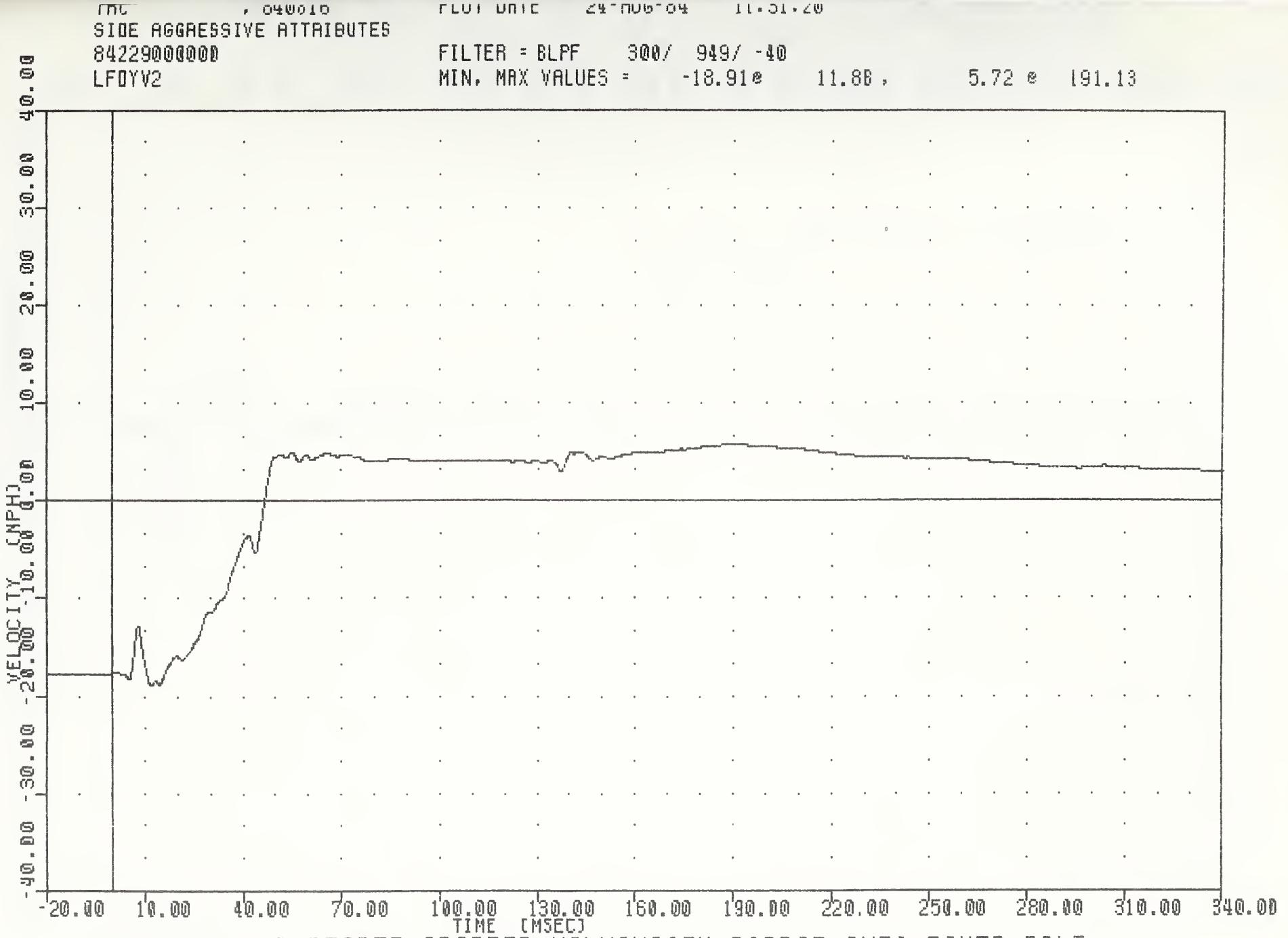
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFDYG1

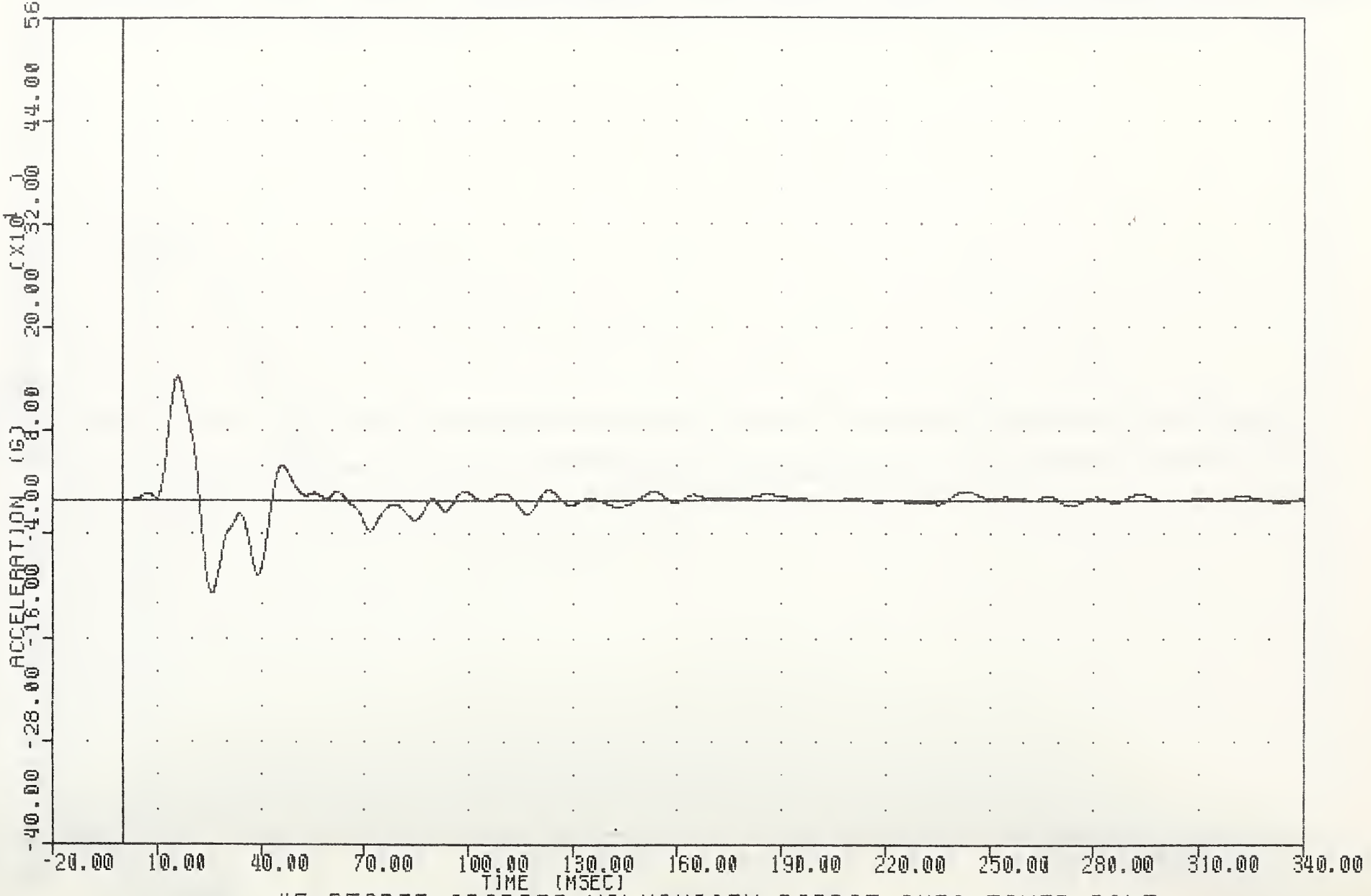


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS



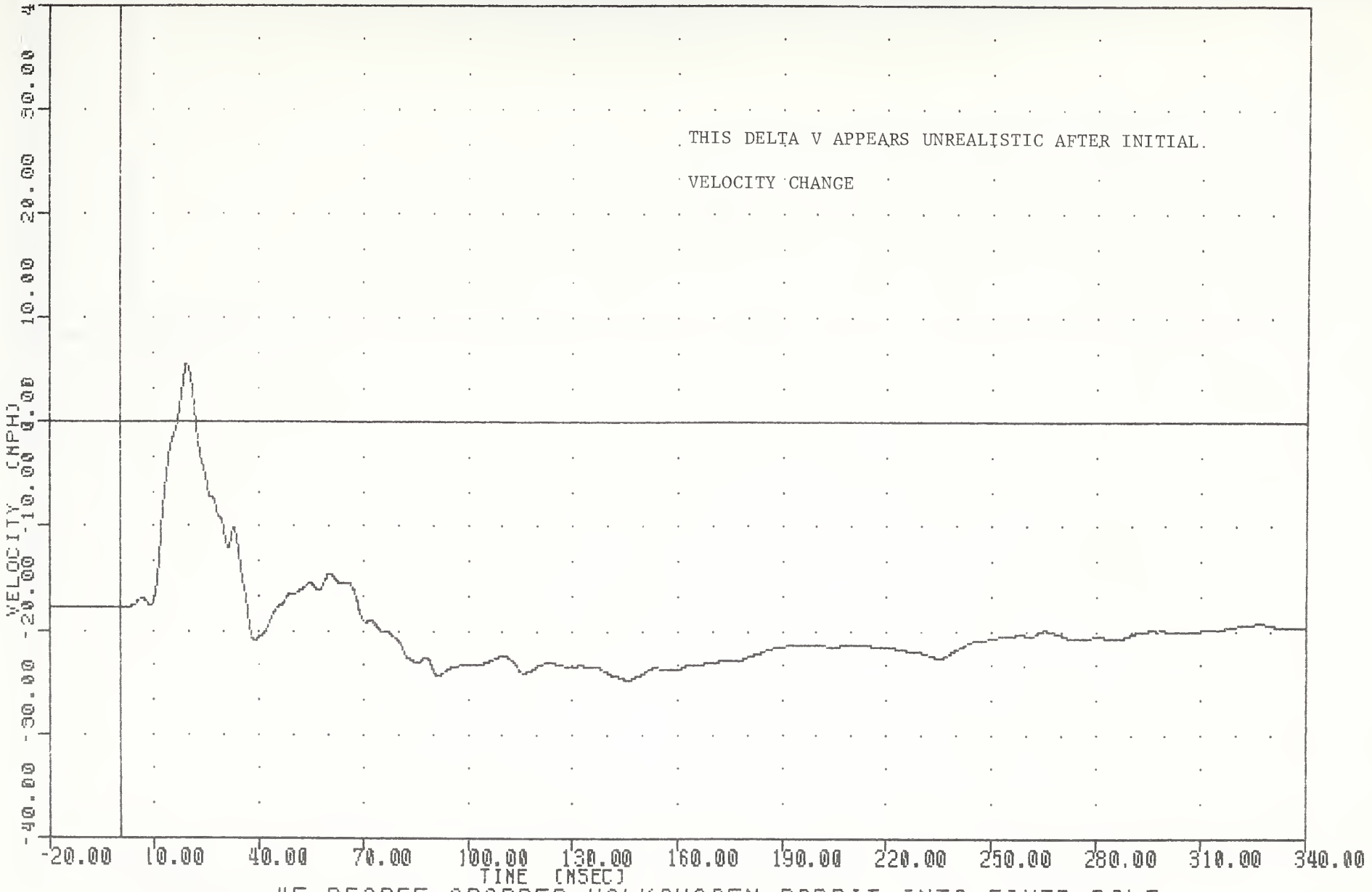
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFDYG2

IRC , 840816 PLOT DATE 24-AUG-84 08:25:57
SIDE AGGRESSIVE ATTAIBUTES
84229000000 FILTER = BLPF 100/ 316/ -40
LFDYG3 MIN, MAX VALUES = -108.45@ 25.50@, 143.00@ 15.63

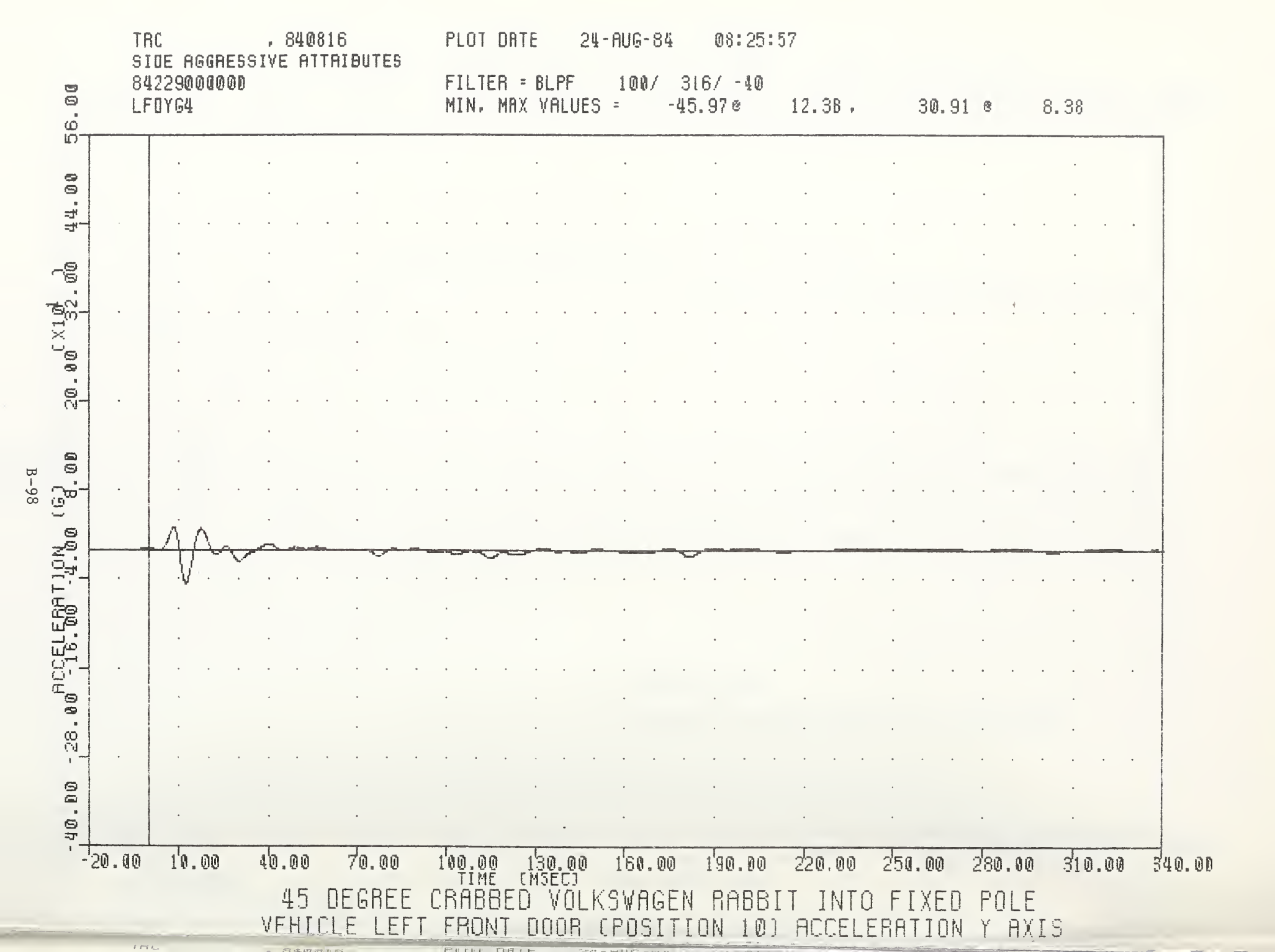


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

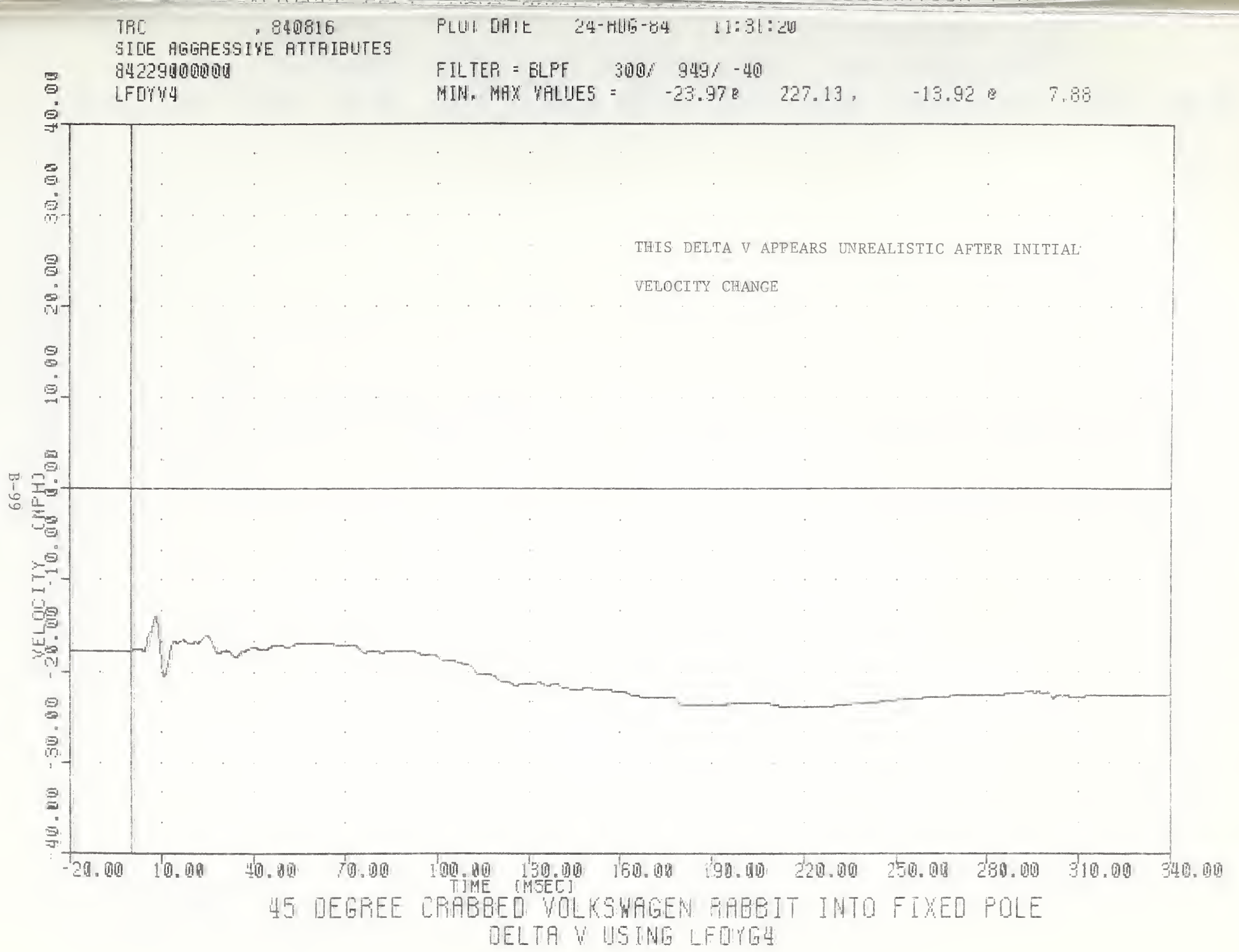
Inc , 040810 PLOT DATE 24-AUG-04 11:31:20
SIDE AGGRESSIVE ATTAIBUTES
84229000000 FILTER = BLPF 300/ 949/ -40
LFDYV3 MIN, MAX VALUES = -24.73@ 145.50 , 5.59 @ 19.13



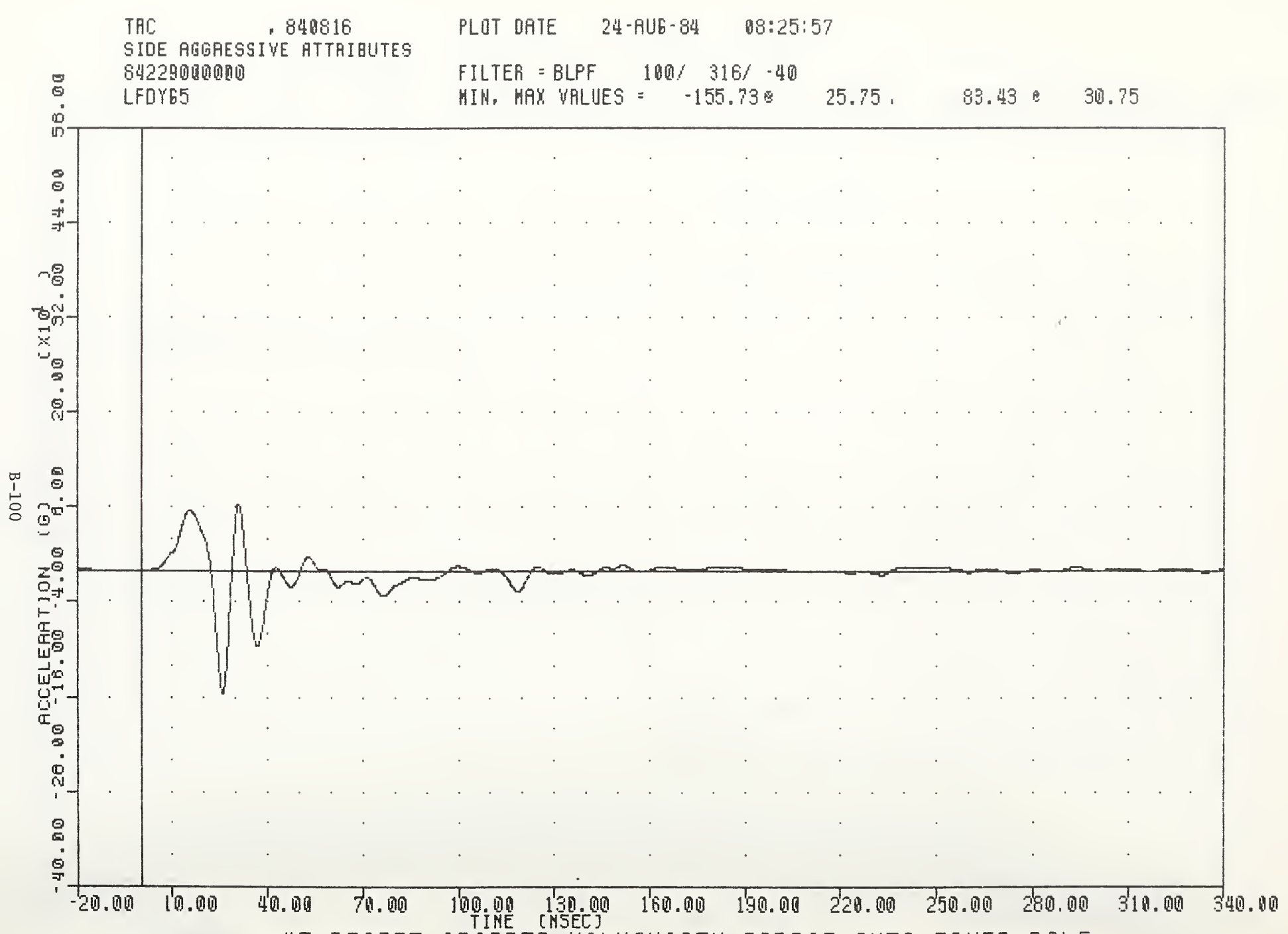
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFDYG3



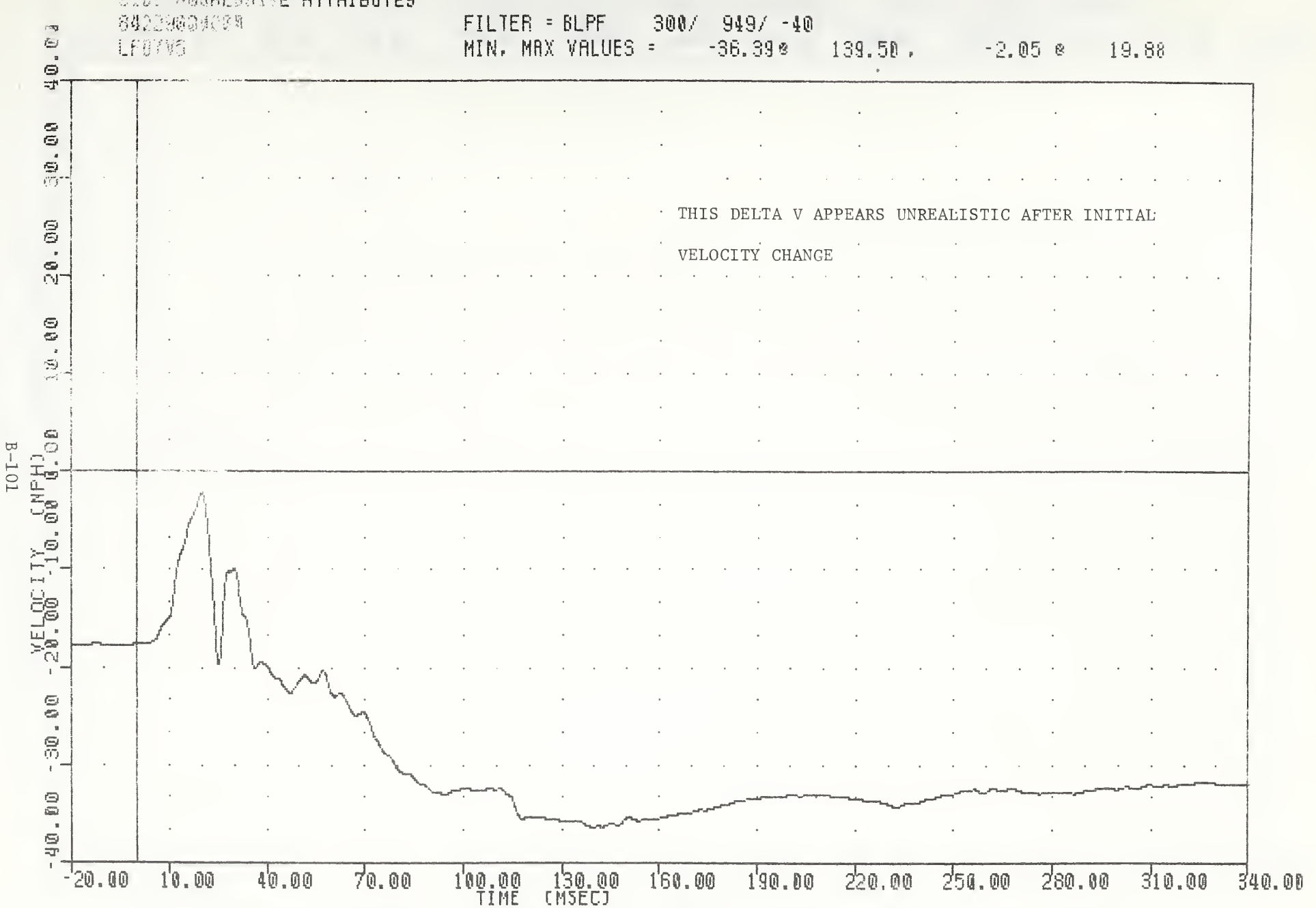
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT DOOR (POSITION 10) ACCELERATION Y AXIS



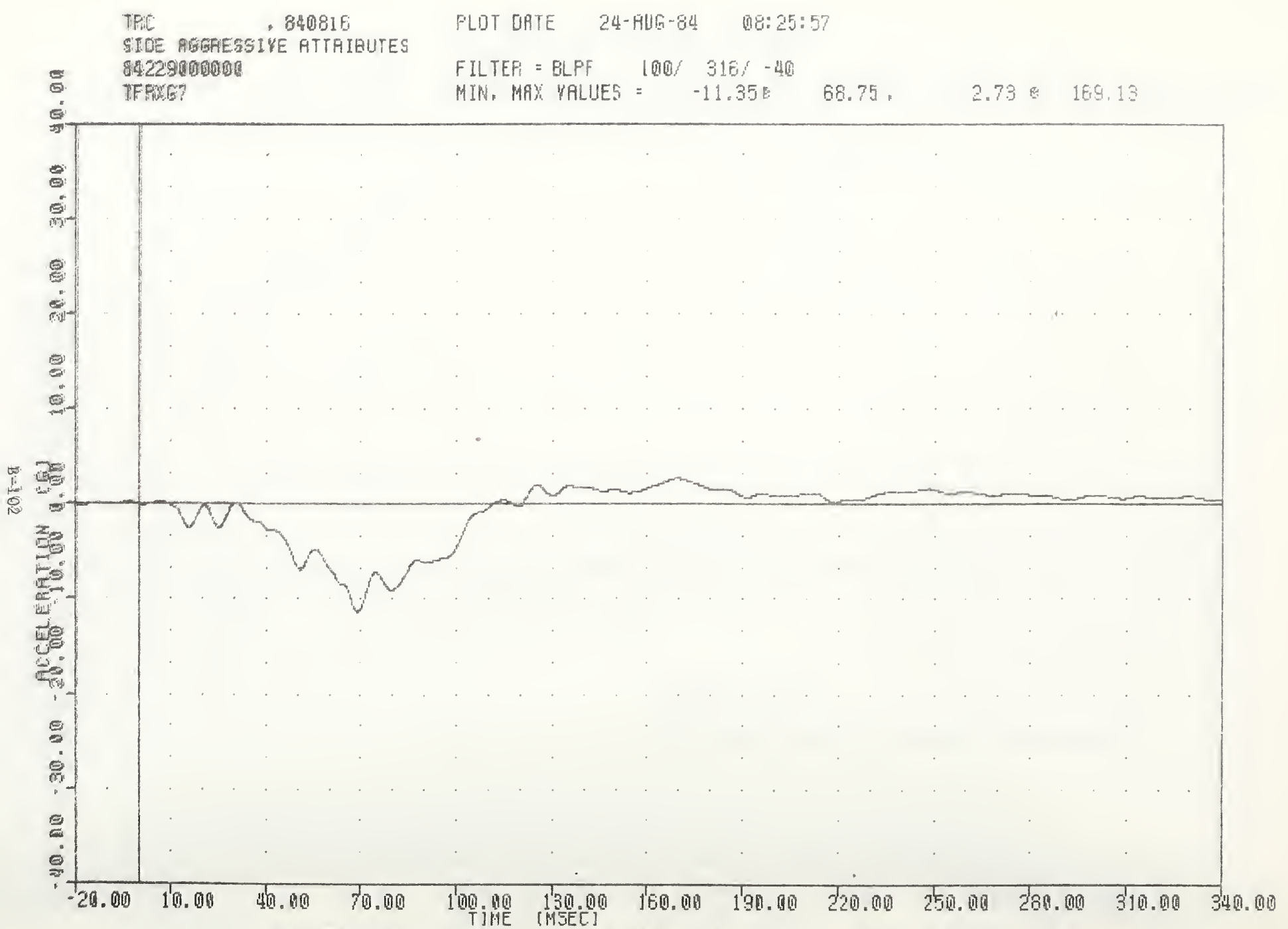
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFOYG4



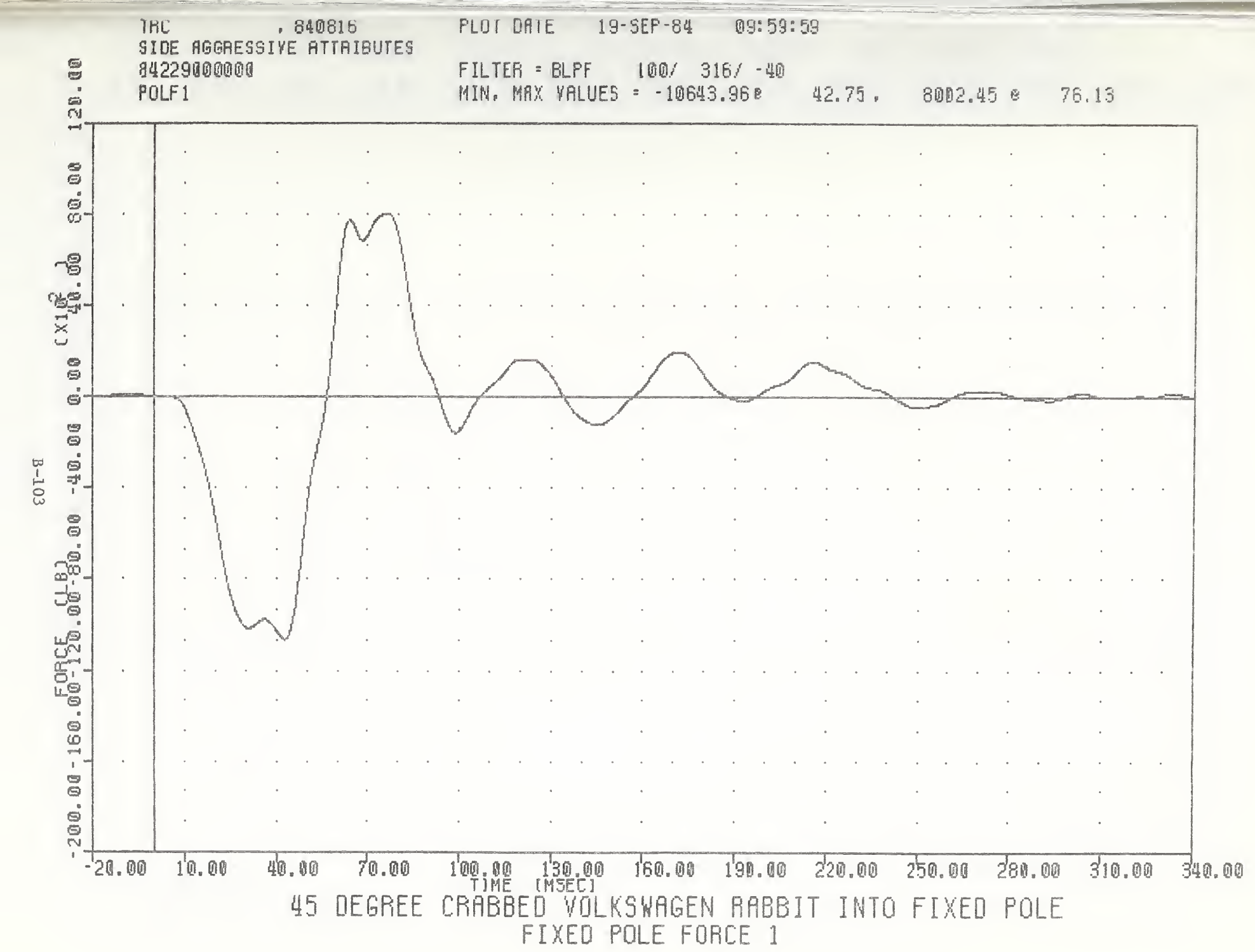
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE LEFT FRONT DOOR (POSITION 11) ACCELERATION Y AXIS



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
DELTA V USING LFDYG5

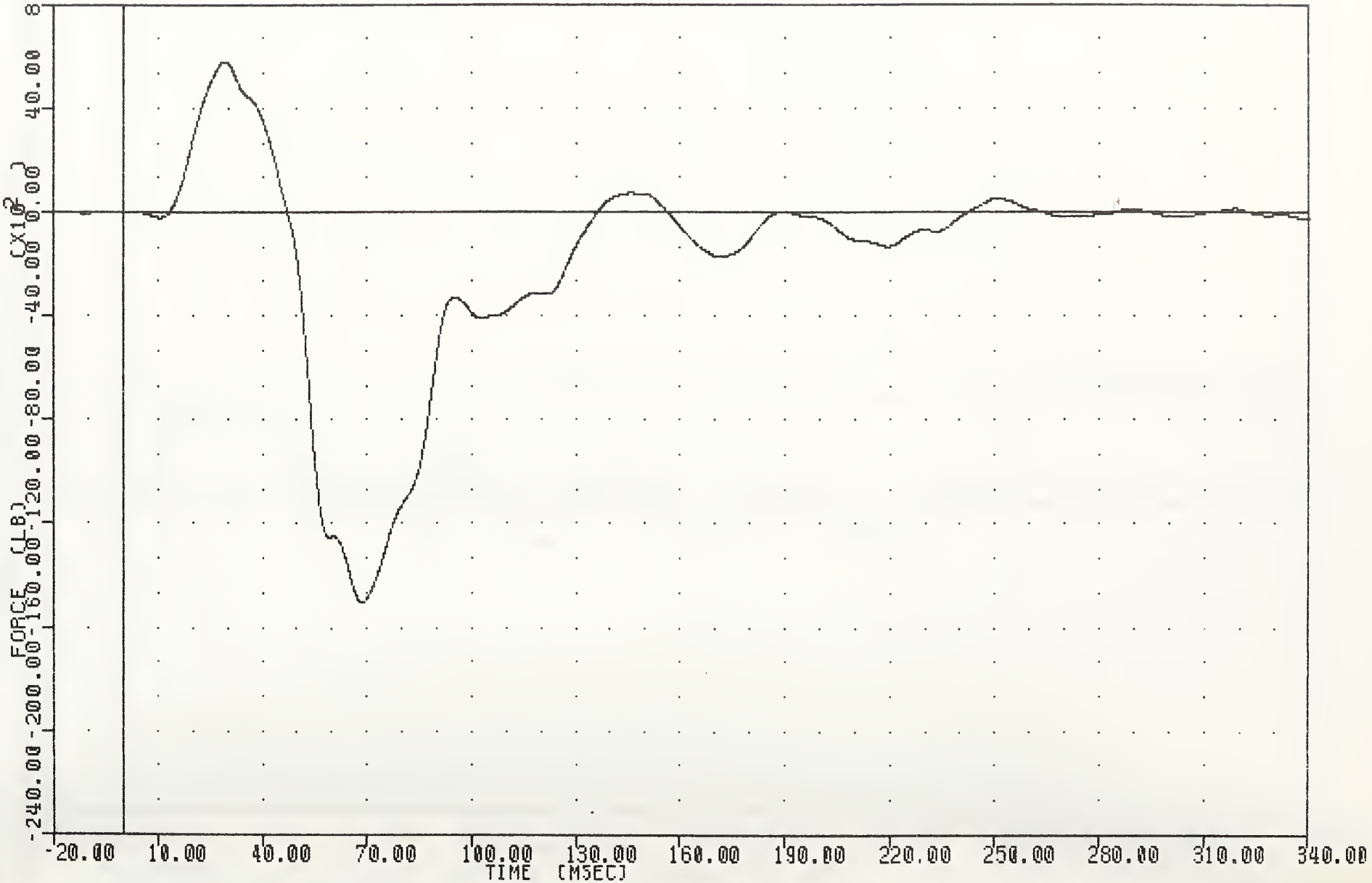


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

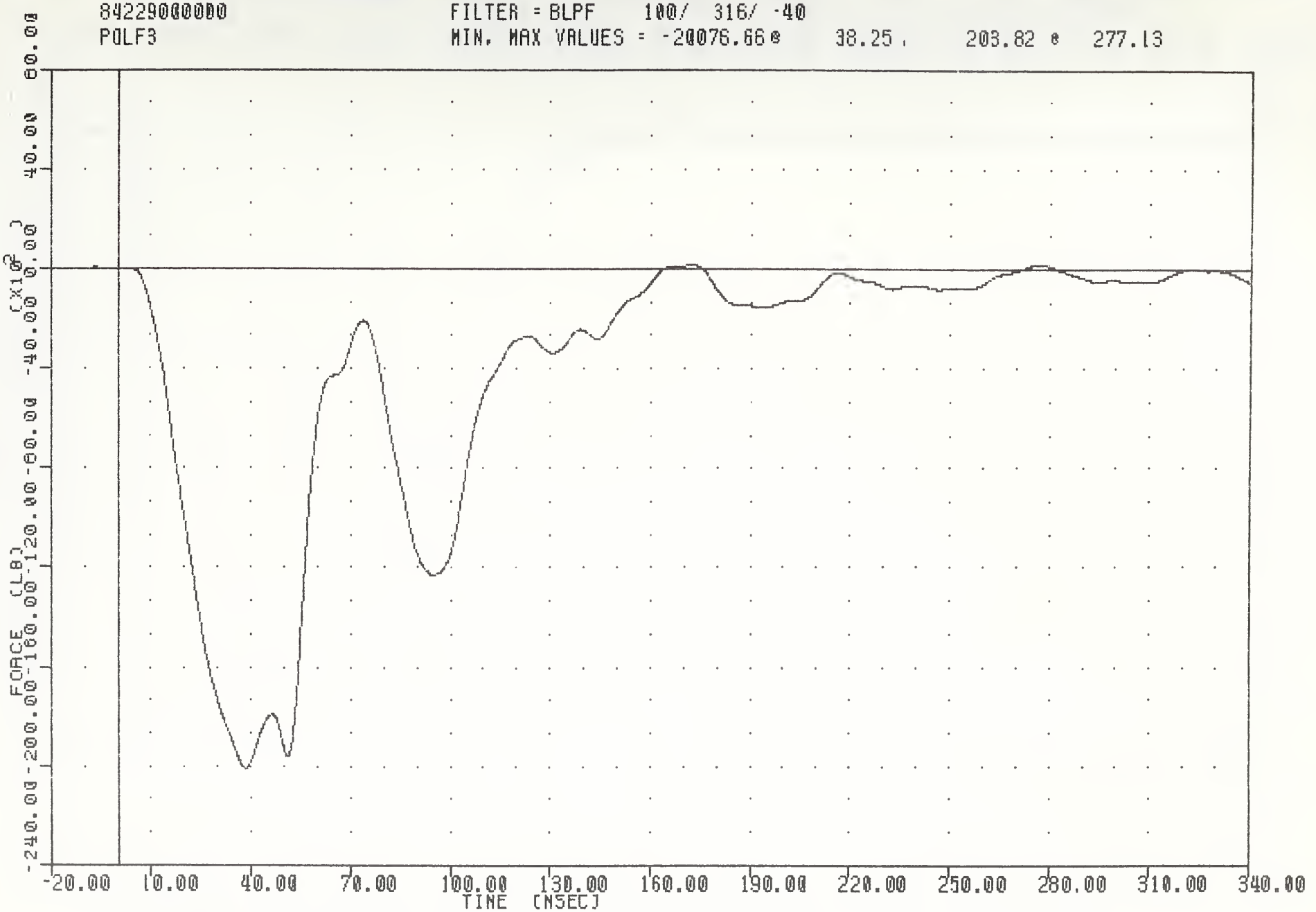


45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
FIXED POLE FORCE 1

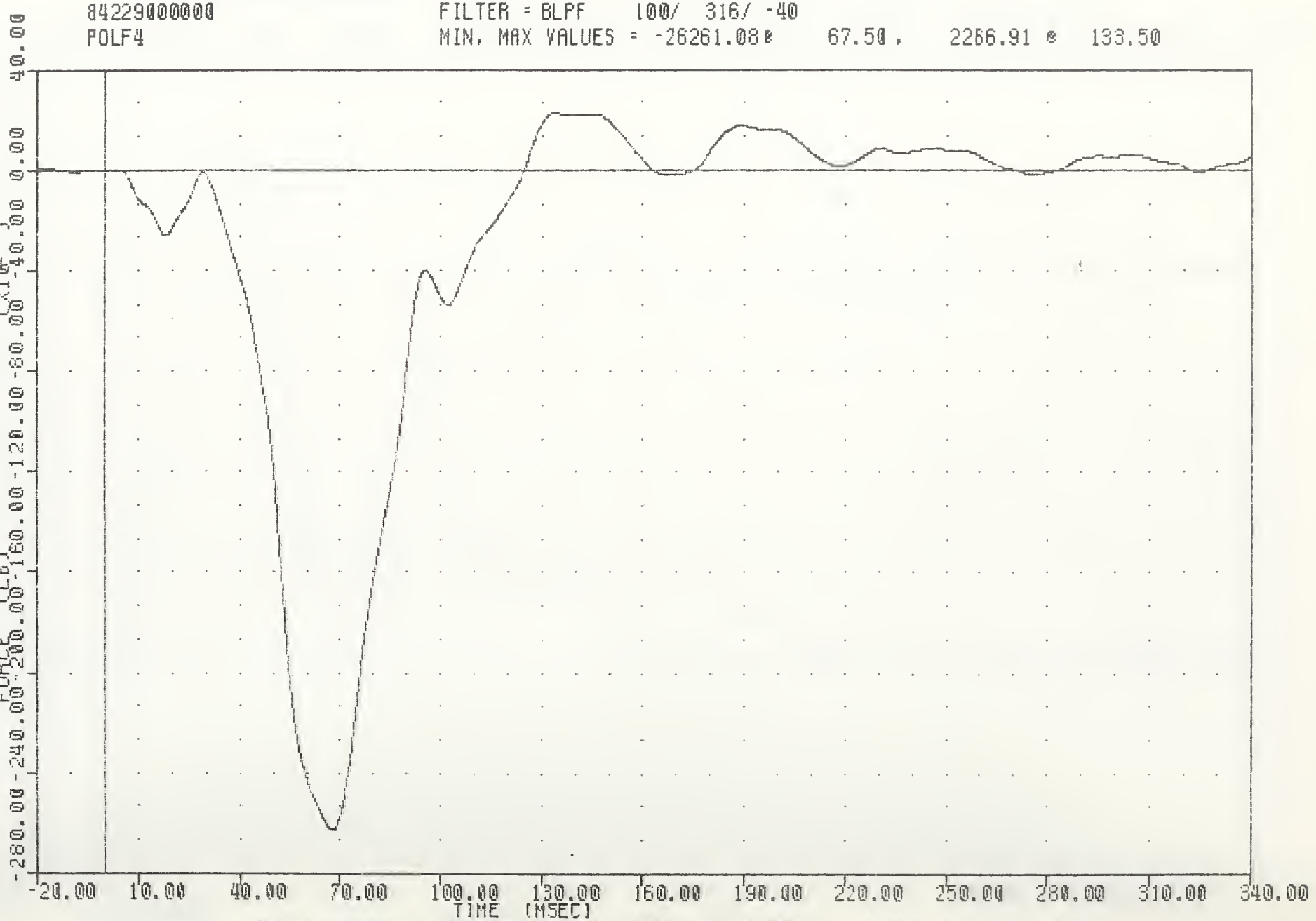
TRC , 840816 PLOT DATE 24-AUG-84 08:25:57
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = BLPF 100/ 316/ -40
POLF2 MIN, MAX VALUES = -15038.08 @ 68.50 , 5790.47 @ 29.13



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
FIXED POLE FORCE 2



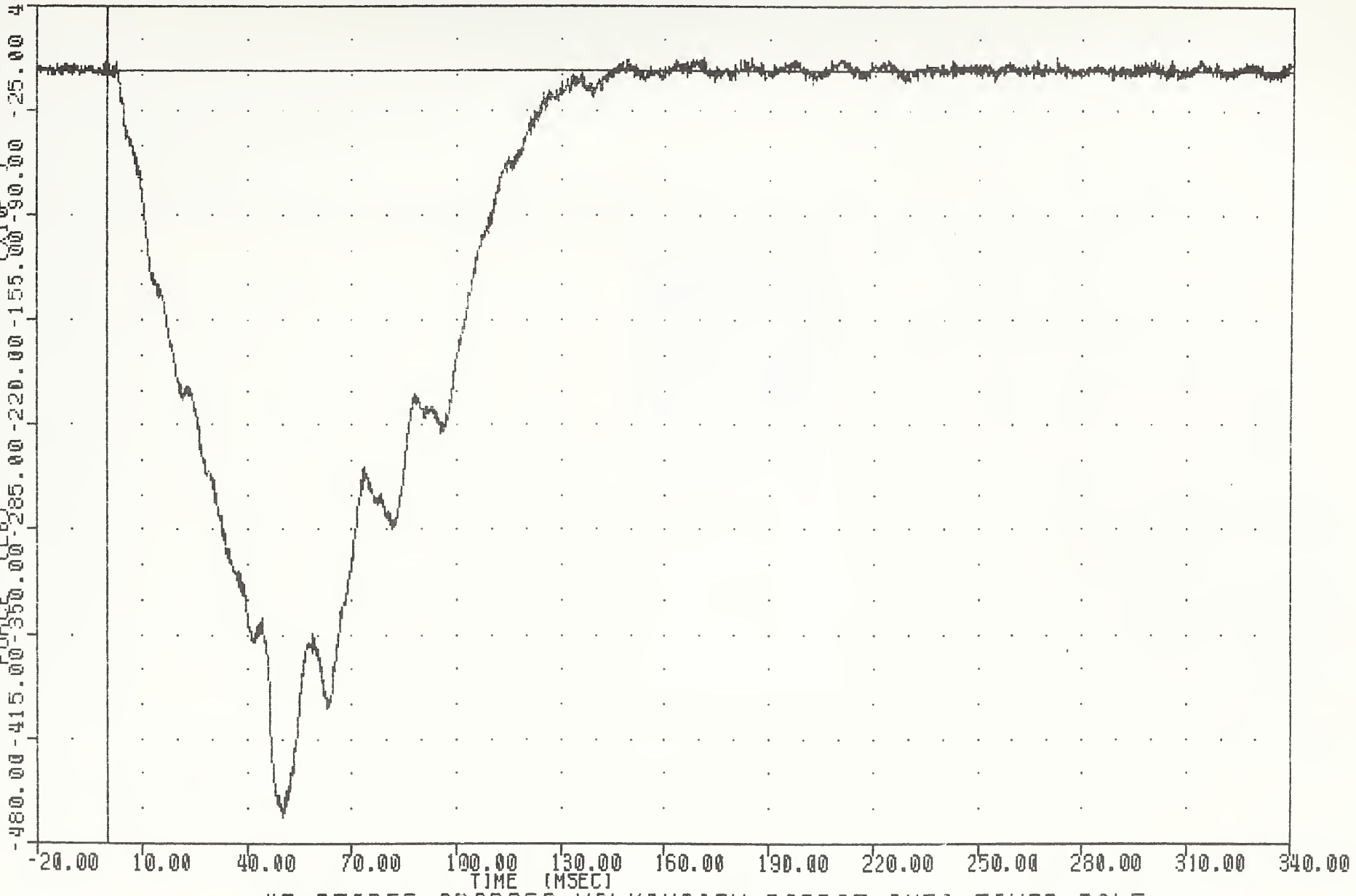
45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
FIXED POLE FORCE 3



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE

FIXED POLE FORCE 4

IRC , 840816 PLOT DATE 11-SEP-84 08:50:59
SIDE AGGRESSIVE ATTRIBUTES
84229000000 FILTER = ALPF 1650/ 5217/ -40
POLFT MIN, MAX VALUES = -46401.70@ 50.13 , 776.61 @ 184.38



45 DEGREE CRABBED VOLKSWAGEN RABBIT INTO FIXED POLE
TOTAL OF FOUR POLE FORCES